BULLETIN

OF THE

MADRAS GOVERNMENT MUSEUM

EDITED BY THE DIRECTOR OF MUSEUMS

DESCRIPTIVE CATALOGUE OF THE BUTTERFLIES

IN THE COLLECTION OF THE MADRAS GOVERNMENT MUSEUM

BY

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(Director of Museums (Retired), Madras Government Museum)

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(Director of Museums (Retired), Government Museum, Madras)

INTRODUCTION

India has been appropriately described as the butterfly-collector's paradise, and perhaps no other group of insects in India has been so exhaustively studied and described as butterflies are. The rich and fascinating variety in their form and size, and the gorgeous splendour of their colour and patterns of colour markings have attracted both the amateur naturalist and the professional scientist, and the popular interest which this group has always aroused has been in a large measure responsible for the substantial mass of literature, both popular and scientific, on this large and attractive assemblage of insects.

Talbot, in his volume on Butterflies, in the Fauna of British India series (second edition, 1929), has outlined briefly, yet thoroughly, the history of the previous work done on butterflies in this country, in his introductory chapter. He has listed therein almost all the important publications on the butterflies of India and to this list may be added the excellent monograph on the Butterflies of the Indian Region by Wynter-Blyth, published by the Bombay Natural History Society in 1957. One might wonder whether in view of all this exhaustive literature, there is any real need for a descriptive catalogue of the kind that has now been compiled. Although it should be admitted that there is very little scope for any original work on the systematic study of Indian Lepidoptera, yet it was considered necessary to bring out a catalogue of all the species of butterflies so far represented in the collection of the Madras Government Museum, in order to make the collections of this Museum better known among the other Museums and scientific institutions both in India and abroad. But at the same time it was felt that a well illustrated and descriptive catalogue will be much more useful than a mere handlist of names. Again, almost all the earlier works including the volumes on butterflies in the Fauna of British India series have dealt with butterflies of the entire Indian Region, and as most, of the species described therein are found only in Assam, Sikkim, Bhutan and other areas in the far north, the student wishing to concentrate on the identification of South Indian butterflies often feels considerable difficulty in wading through the entire range of species before he is able to determine the South Indian species. As the Madras Museum collection contains mostly South Indian species, it is expected that the present work will serve more or less as a guide to South Indian butterflies on which there is no convenient handbook at present. It was mainly these considerations that prompted the author to compile the present catalogue in the descriptive and illustrated form in which it has appeared; and incidentally, when the measurements of the wing expanse of the

specimens in the collection were compared to the existing records for the coresponding species. It was found that in many cases the measurements were above or below the maximum and minimum recorded expanse for these particular species, thereby establishing new records in the range of expanse for these species.

Regarding the structure, variation, distribution, ecology and methods of setting and preserving butterflies, Talbot and Wynter-Blyth have given exhaustive accounts in their respective publications cited above, and it is therefore needless to repeat them here.

The classification adopted in the present catalogue is that adopted by Wynter-Blyth. This is the same as that followed by Talbot in his volume in the Fauna of British India series (Volume I), for Papilionidae and Pieridae, as this is the most up-to-date standard work on Indian butterflies, belonging to these families. For the remaining families, the classification followed by Evans in his "Identification of Indian Butterflies" has been followed.

In identifying butterflies, it is necessary to remember that there is considerable seasonal and individual variation in many species of butterflies. Hence it is necessary to confirm the identifications made with the help of descriptions by checking the locality, size, habit and other details before one can be sure of the identification.

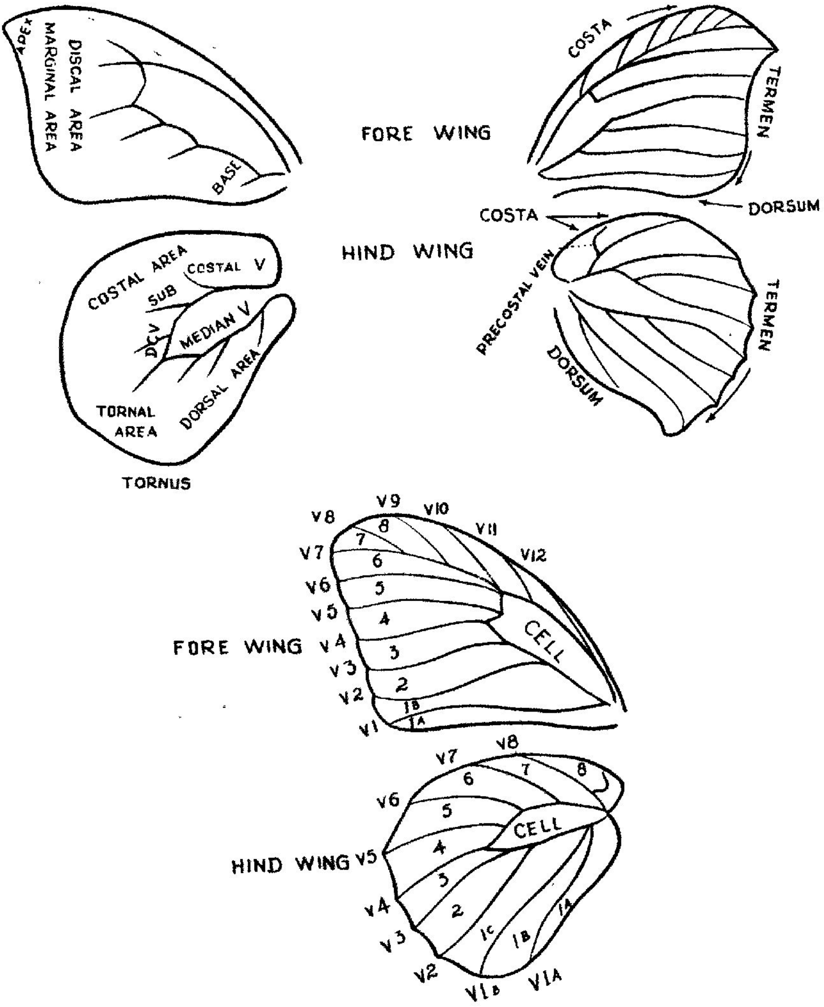
In order to identify a butterfly correctly, one has to become conversant with the structure of the wings of the butterfly and their venation, and with the various descriptive terms applied to the different part of the wings.

The terminology of the various parts of the wing and its venation is illustrated in the accompanying figure.

The majority of the specimens represented in the Museum collection are from localities in South India although the general range of distribution of the species to which they belong may be much wider, extending into localities in North India, even as far as the Himalayas, Assam, Sikkim, Bhutan, and sometimes even to Burma and Malay Peninsula. In South India, it is the hilly regions, such as the Nilgiris, Pulney Hills, Western Ghats, etc., that are particularly rich in butterflies, especially those of the larger, more colourful and attractive species, but a large number of species occur also in the plains.

The total number of species of butterflies recorded from the Indian Region is about 868 and out of these, the distribution of about 285 species extends to South India. The number of species of butterflies found exclusively in South India is about 45, most of which are found in the hilly regions such as the Nilgiris, Pulney Hills and Western Ghats. The number of species represented in the collection of the Madras Government Museum is 228, almost all of them being South Indian forms, but their distribution extends in most cases to North India and sometimes even beyond Indian limits. In a large number of cases it is the South Indian races of the species that are represented in the Museum collection.

In the systematic descriptions of the species in the present catalogue, the wing measurements mentioned under the head "Specimens in the collection" for each species



DIAGRAMS ILLUSTRATING THE TERMINOLOGY OF THE VARIOUS PARTS OF THE WINGS AND THEIR VENATION IN BUTTERFLIES.

(V : Vein ; DCV : Discocellular vein)

is the average of the largest and the smallest of the specimens, where there are more than two specimens. In the case of species of which only two specimens are represented, it is the average of these two, and in cases where there is only a single specimen, the measurement of this single specimen is mentioned. Special mention is made of specimens which measure either less or more than the minimum or maximum recorded expanse respectively, for the particular species.

The literature on this subject is very extensive, and apart from standard descriptive works such as Lepidoptera Indica and the Fauna of British India volumes on Butterflies, numerous papers have been published on Indian butterflies, notably in the Journal of the Bombay Natural History Society, Records of the Indian Museum, Journal of the Asiatc Society of Bengal and the Proceedings of the Zoological Society of London. An abridged bibliography on the subject, listing some of the standard monographic works and a selection of the more important systematic papers, is appended at the end of the present paper, but further references can be readily traced by the reader from the extensive bibliography in the latest edition of the volume on Butterflies by Talbot in the Fauna of British India series.

I wish to acknowledge my gratitude to Miss. D. Chandramirtham, former Assistant Curator for Zoology, for her assistance in rearranging the collections, preparing the systematic lists of the species and taking the wing measurements of the specimens in the collection, to Miss. A. Vimala, former Assistant Curator for Zoology, for her assistance in the preparation of the Bibliography and Index, and to Sri R.N. Meganathan, Artist-modeller of the Government Museum, Madras, for the care and skill with which he has prepared the coloured illustrations for this paper.

KEY TO THE FAMILIES OF BUTTERFLIES

(Adapted from Talbot's Fauna of British India volume on Butterflies, and Wynter-Blyth's "Butterflies of the Indian Region.")

1.	Forewing with vein 7 forked. Antennae closely approximated together at base	... 2
-	Forewing with all veins arising from the cell. Antennae wide apart at base and often with a hooked club	... Hesperiidae.
2.	Hind wing without a precostal vein (except in a few species of the Pieridae)	... 3
-	Hind wing without a precostal vein. All legs perfect in both sexes	... Lycaenidae
3.	Forelegs fully developed in both sexes	... 4
-	Forelegs imperfectly developed in one or both sexes	... 5
4.	Inner margin of hind wing channelled to receive the abdomen; hind wing with vein 1 a absent (present in all other families). Large, brightly coloured butterflies with the hind wings often tailed	... Papilionidae.

- Inner margin of hind wing not channelled to receive the abdomen. Hind wing with vein 1 a always present. Moderate-sized, usually white or yellow; hind wing never tailed ... Pieridae

5. Forelegs imperfect in both sexes ... 6
- Forelegs imperfect and brush-like in the male, perfect and developed for walking in the female. Moderate-sized, usually brown or tawny, with the hind wing often toothed or tailed ... Erycinidae

6. Both wings with the cell closed (i.e. cross veins are present) ... 7
- Hind wing with the cell open (i.e. cross veins absent). Cell narrowly closed in a few cases ... 9

7. Fore wing with vein 1 a forked with vein 1 b (i.e. vein 1 runs into the median vein at the base). Large, dark brown or tawny butterflies, often shot with blue and streaked or spotted ... Danaidae.
- Fore wing with vein 1 a free (i.e. vein 1 runs free into the base) ... 8

8. Fore wing with one or more veins inflated or swollen at the base (except in a few cases). Normally scaled wings, not spotted. Medim-sized dark brown butterflies with ocelli on the wings ... Satyridae
- Fore wing without any vein inflated at the base. Wings sparsely scaled and spotted. Brick-red or yellowish brown butterflies, with elongate wings and abdomen ... Acraeidae

9. Palpi small, narrow and sharp in front. Large, broad-winged butterflies with the costa of fore wing strongly arched and antennae gradually enlarged to a narrow club ...Amathusidae
- Palpi large, broad and rounded in front. The cell of the fore wing usually open. Moderate-sized, usually coloured butterflies of very varied shape and appearance. Antennae much more abruptly enlarged to a club. ... Nymphalidae

SYSTEMATIC LIST OF THE SPECIES AND RACES OF BUTTERFLIES REPRESENTED IN THE COLLECTION OF THE MADRAS GOVERNMENT MUSEUM.

Note : The figures mentioned within brackets against each species or race indicate the number of specimens of that particular species or race present in the Museum collection.

Family PAPILIONIDAE.

Genus **Troides** Hubner.

Troides helena minos (Cramer) (2).

Genus **Polydorus** Swainson.

Polydorus hector (Linnaeus) (11)

Polydorus aristolochiae (Fabricius) (7)

Genus **Chilasa** Moore.

Chilasa clytia clytia (Linnaeus) form *clytia* Linnaeus (1)

Chilasa clytia clytia (Linnaeus) form *dissimilis* Linnaeus (3).

Genus **Papilio** Linnaeus.

Papilio polymenstor polymenstor Cramer (6)

Papilio paris tamilana Moore (3).

Papilio crino Fabricius (3).

Papilio buddha Westwood (1).

Papillio dravidarum Wood-Mason (1)

Papilio helenus daksha Moore (8),

Papilio polytes romulus Cramer (8).

Papilio demoleus demoleus Linnaeus (14)

Genus **Graphium** Scopoli (= **Pathysa** Reakirt)

Graphium nomius nomius (Esper) (1).

Graphium antiphates naira (Moore) (1).

Graphium sarpedon teredon (C. & R. Felder) (11)

Graphium doson eleius (Fruhstorfer) (10)

Graphium agamemnon menides (Fruhstorfer) (8)

Graphium cloanthus (Westwood) (1).

Family PIERIDAE.

Subfamily PIERINAE.

Genus **Leptosia** Hübner.

Leptosia nina nina (Fabricius) (9)

Genus **Aporia** Hübner

Aporia craetegi Lamarck (European species) (2)

Aporia leucodice soracta Moore (1).

Genus **Delias** Hübner

Delias eucharis Drury (10)

Delias thysbe kandha Doherty (3)

Delias descombesi leucacantha Fruhstorfer (1).

Genus **Cepora** Billberg.

Cepora nerissa Phryne (Fabricius) (11)

Cepora nadina remba (Moore) (2)

Genus **Prioneris** Wallace.

Prioneris sita (C. & R. Felder) (2)

Genus **Anaphels** Hübner.

Anaphels aurota aurota (Fabricius) (7)

Genus **Appias** Hübner.

Appias lalage lalage (Doubleday) (1).

Appias indra shiva (Swinhoe) (6)

Appias libythea libythea (Fabricius) (2).

Appias lyncida taprobana Moore (1).

Appias lyncida latifasciata Moore (2).

Appias lyncida eleonora Boisduval *(1)*
Appias albina darada (C & R. Felder) (17)
Appias wardi (Moore) (1).

Genus **Pieris** Schrank.
Pieris canida canis Evans (6)
Pieris callidice kalora Moore (1)
Pieris brassicae (Linnaeus) (2)
Pieris rapae (Linnaeus) (4)
Pieris napi ajaka Moore (2)

Genus **Pontia** Fabricius.
Pontia daplidice moorei (Rober) (2)

Genus **Ixias** Hübner.
Ixias marianne (Cramer) (4)
Ixias pyrene sesia (Fabricius (9)

Genus **Colotis** Hübner.
Colotis calais modestus (Butler) (6)
Colotis fausta fulvia (Wallace) (1)
Colotis eucharis (Fabricius) (5).
Colotis danae danae (Fabricius) (6).

Genus **Hebomoia** Hübner.
Hebomoia glaucippe australis (Butler) (3).

Genus **Valeria** Horsfield (= **Pareronia** Bingham).
Valeria ceylanica ceylanica (Felder) (2)
Valeria valeria hippia (Fabricius) (2)

Subfamily COLIADINAE

Genus **Catopsilia** Hübner.
Catopsilia crocale crocale Cramer (23)
Catopsilia pyranthe pyranthe (Linnaeus) (24)
Catopsilia florella gnoma (Fabricius) (1)

Genus **Gonepteryx** Leach.
Gonepteryx rhamni nepalensis (Linnaeus) (3).

Genus **Eurema** Hübner.
Eurema brigitta Cramer (7).
Eurema blanda silhetana (Wallace) (1).
Eurema hecabe simulata (Moore) (19).

Genus **Colias** Fabricius.
Colias erate erate (Esper) (3).
Colias erate nilagiriensis **C. & R.** Felder (8)

Family DANAIDAE.

Genus **Hestia** Hübner.
Hestia lynceus malabaricus (Moore) (2).

Genus **Danais** Latreille.

Danais plexippus (Linnaeus) (5)

Danais chrysippus (Linnaeus) (12)

Danais limniace mutina Fruhstorfer (9)

Danais melissa dravidarum Fruhstorfer (8).

Danais aglea aglea Cramer (5).

Danais nilgiriensis Moore (4)

Genus **Euploea** Fabricius.

Euploea core core Cramer (35)

Euploea coreta coreta Godart (3)

Euploea diocletiana Fabricius (1).

Euploea kollari Felder (2)

Euploea mulciber Cramer (1).

Family SATYRIDAE.

Genus **Mycalesis** Hübner.

Mycalesis anaxias Hewitson (1).

Mycalesis perseus typhlus Fruhstorfer (5).

Mycalesis mineus polydecta Cramer (3).

Mycalesis visala visala Moore (2)

Mycalesis subdita Moore (3).

Mycalesis khasia ochra Evans (2).

Mycalesis adolphei Guerin (1).

Mycalesis oculus Marshall (2).

Mycalesis patnia junonia Butler (1).

Genus **Lethe** Hübner.

Lethe europa ragalva Fruhstorfer (4).

Lethe drypetis todara Moore (3).

Lethe rohria nilgiriensis Guerin (8).

Genus **Ypthima** Hübner.

Ypthima asterope mahrata Moore (1).

Ypthima ypthimoides Moore (2).

Ypthima chenui Guerin-Meneville (2)

Ypthima ceylonica Hewitson (2).

Ypthima hubneri hubneri Kirby (4).

Ypthima avanta singala Felder (1).

Ypthima philomela tabella Marshall & De Niceville (1).

Ypthima baldus madrasa Evans (5).

Genus **Zipoetis** Hewitson.

Zipoetis saitis Hewitson (3).

Genus **Orsotrioena** Wallengren.

Orsotrioena medus mendata Moore (1).

Genus **Melanitis** Fabricius.

Melanitis leda ismene Cramer (14)

Melanitis phedima varaha Moore (3).

Genus **Elymnias** Hübner.

Elymnias hypermnestra caudata Butler (2).

Genus **Nytha** Billberg.

Nytha hermiona Linnaeus (1)

Family AMATHUSIDAE.

Genus **Discophora** Boisduval.

Discophora lepida lepida (Moore) (1)

Family NYMPHALIDAE.

Genus **Charaxes** Ochsenheimer.

Charaxes polyxena imna Bütler (1).

Charaxes fabius fabius (Fabricius) (1).

Genus **Eriboea** Moore.

Eriboea athamas agrarius Swinhoe (2).

Genus **Apatura** Fabricius.

Apatura pariatis atacinus Fruhstorfer (4).

Genus **Euripus** Westwood.

Euripus consimilis meridionalis Wood-Mason.

Genus **Euthalia** Hubner.

Euthalia lepidea (Bütler) (3).

Euthalia garuda (Moore) (2).

Euthalia nais Foster (2).

Genus **Parthenos** Hubner.

Parthenos sylvia virens Moore (1).

Genus **Limenitis** Fabricius.

Limenitis procris undifragus Fruhstorfer.

Genus **Pantoporia** Hubner.

Pantoporia solenophora kanara Evans (1).

Pantopria perius (Linnaeus) (2).

Genus **Neptis** Fabricius.

Neptis columella nilgirica Moore (1).

Neptis jumbha jumbha Moore (1).

Neptis hylas varmona Moore (10).

Neptis soma kallaura Moore (1).

Neptis hordonia hordonia Stoll (1).

Genus **Cyrestis** Boisduval.

Cyrestis thyodamas indica Evans (4).

Genus **Hypolimnas** Hubner.

Hypolimnas bolina (Linnaeus) (8).

Hypolimnas misippus (Linnaeus) (5).

Genus **Kallima** Doubleday.

Kallima inachus (Boisdural) (3)

Kallima philarchus (Westwood) (1)

Genus **Precis** Hubner.

Precis hierta hierta Fabricius (7)

Precis orithya swinhoei Butler (12)

Precis lemonias vaisya Fruhstorfer (3)

Precis almana almana (Linnaeus) (8)

Precis atlites (Johanssen) (5)

Precis iphita pluviatilis Fruhstorfer (10)

Genus **Vanessa** Fabricius.

Vanessa cardui Linnaeus (5)

Vanessa indica pholae fruhstorfer (2)

Vanessa atalanta Linnaeus (2)

Vanessa canace viridis Evans (4)

Vanessa C-album cognata Moore (3)

Genus **Argynnis** Fabricius.

Argynnis hyperbius hybrida Evans (2)

Argynnis hyperbius castetsi Oberthur (3)

Argynnis aglaia (Linnaeus) (2)

Argynnis lathonia (Linnaeus) (5)

Genus **Atella** Doubleday

Atella phalantha (Drury) (7)

Atella alcippe mercea Evans (1)

Genus **Melitaea** Fabricius.

Melitaea didyma (Esper) (3).

Genus **Cupha** Billberg.

Cupha erymanthis maja Fruhstorfer (7).

Genus **Cynthia** Fabricius.

Cynthia erota saloma Swinhoe (8).

Genus **Cirrochroa** Doubleday.

Cirrochroa thais thais Fruhstofer. (6).

Genus **Byblia** Hübner.

Byblia ilithiya (Drury) (2).

Genus **Ergolis** Boisduval.

Ergolis ariadne (Johanssen) (7).

Ergolis merione merione (Cramer) (4).

Ergolis merione taprobana Westwood (4).

Family ACRAEIDAE.

Genus **Telchinia** Hübner.

Telchinia violae (Fabricius) (15).

Family ERYCINIDAE

Subfamily LIBYTHEINAE.

Genus *Libythea* Fabricius.

Libythea myrrah carma Fruhstorfer (6).

Subfamily RIODINAE.

Genus **Abisara** Felder.

Abisara echerius prunosa Moore (2).

Family LYCAENIDAE.

Subfamily LYCAENINAE.

Genus **Spalgis** Westwood.

Spalgis epius epius Westwood (1).

Genus **Talicada** Moore.

Talicada nyseus nyseus Guerin (4).

Genus **Castalius** Hübner.

Castalius rosimon rosimon (Fabricius) (7).

Castalius caleta (Hawitson) (1).

Castalius ethion (Doubleday & Hewitson) (6).

Genus **Syntarucus** Moore.

Syntarucus plinius (Fabricius) (4).

Genus **Azanus** Moore.

Azanus uranus Butler (1).

Azanus jesous gamra Lederer (1).

Genus **Neopithecops** Distant.

Neopithecops zalmora Butler (1)

Genus **Everes** Hübner.

Everes parrhasius parrhasius Fabricius (2)

Genus **Lycaenopsis** Felder.

Lycaenopsis puspa gisca (Fruhstorfer) (6)

Lycaenopsis albidisca Moore (5).

Lycaenopsis limbata limbata Moore (1).

Genus **Chilades** Moore.

Chilades laius (Cramer) (8).

Genus *Zizeeria* Moore.

Zizeeria trochilus putli Kollar (1).

Zizeeria lysimon Hübner (1).

Zizeeria gaika Trimen (1).

Zizeeria otis decreta Butler (4).

Genus **Euchrysops** Butler.

Euchrysops cnejus Fabricius (1).

Euchrysops pandava pandava (Horsfield)

Genus **Catochrysops** Boisduval.

Catochrysops strabo (Fabricius) (5).

Genus **Lampides** Hübner.
Lampides boetocis (Linnaeus) (6).
Genus **Jamides** Hübner.
Jamides bochus bochus Cramer (1).
Jamides celeno celeno Cramer (6).
Jamides elpis eurysaces Frushtorfer (1).
Genus **Nacaduba** Moore.
Nacaduba nora Felder (5).
Nacaduba noreia hampsoni De Niceville (1).
Subfamily THECLINAE.
Genus **Curetis** Hübner.
Curetis thetis Drury (8).
Genus **Iraota** Moore.
Iraota timoleon timoleon (Stoll) (1).
Genus **Amblypodia** Horsfield.
Amblypodia amantes amantes Hewitson (2).
Amblypodia bazaloides Hewitson (1).
Genus **Loxura** Horsfield.
Loxura atymnus arcuata Moore. (2).
Loxura atymnus surya Moore (1).
Genus **Spindasis** Wallengren.
Spindasis vulcanus vulcanus Fabricius (2).
Spindasis schistacea schistacea Moore (1).
Spindasis ictis ictis Hewitson (2).
Spindasis lohita lazularia Moore (2).
Genus **Zesius** Hübner
Zesius chrysomallus Hubner (2).
Genus **Tajuria** Moore.
Tajuria cippus cippus (Fabricius) (3).
Genus **Cheritra** Moore.
Cheritra freja jaffra Butler (2).
Genus **Rathinda** Moore.
Rathinda amor (Fabricius) (4).
Genus **Catapoeceilma** Butler
Catapoecelima elegans myositina Fruhstorfer (2).
Genus **Deudoryx** Hewitson.
Deudoryx epijarbas epijarbas Moore (6).
Genus **Virachola** Moore.
Virachola isocrates (Fabricius) (3).
Genus **Rapala** Moore.
Rapala melampus Cramer (2).
Genus **Bindahara** Moore.
Bindahara phocides moorei Fruhstorfer (1).

Family HESPERIIDAE.

Subfamily 1. CELAENORRHINAE.

Genus *Celaenorrhinus* Hübner.

Celaenorrhinus leucocera leucocera Kolliker (3).

Genus **Tagiades** Hübner

Tagiades obscurus athos Plotz (3).

Tagiades atticus atticus (Fabricius) (1).

Tagiades litigiosa vijuna Fruhstorfer (4).

Genus **Coladenia** Moore.

Coladenia dan dan (Fabricius) (3).

Coladenia indrani iadra Evans (1).

Genus **Tapena** Moore.

Tapena thwaitesi hampsoni Elwes (1).

Genus **Odontoptilum** De Niceville.

Odontoptilum angulata Felder (1).

Genus **Caprona** Wallengren.

Caprona ransonnetti potiphera Hewitson (3).

Subfamily 2. HESPERIINAE.

Genus **Syrichtus** Boisduval (= **Hepseria** Fabricius).

Syrichtus galba (Fabricius).

Genus **Gomalia** Moore.

Gomalia elma albofasciata Moore (3).

Subfamily 3. ISMENINAE

Genus **Hasora** Moore.

Hasora alexis alexis (Fabricius) (6).

Genus **Ismene** Watson.

Ismene jaina fergussoni De Nicevile (3).

Genus **Choaspes** Moore.

Choaspes benjaminni (Guerin) (2).

Genus **Badamia** Moore.

Badamia exclamationis Fabricius (8).

Subfamily 4. PLASTINGIINAE.

Genus **Suastus** Moore.

Suastus gremius gremius (Fabricius) (6)

Genus **Arnetta** Watson.

Arnetta vindhiana (Moore) (1).

Subfamily 5. ERIONTINAE.

Genus **Gangara** Moore

Gangara thysis thyrsis (Fabricius) (1).

Subfamily 6. PAMPHILINAE.

Genus **Taractrocera** Butler.

Taractrocera maevius flaccus (Fabricius) (5).

Genus **Ampitta** Moore

Ampitta dioscorides (Fabricius) (2)

Subfamily 7. ERYNNINAE.

Genus **Telicota** Moore.

Telicota augias augias (Linnaeus) (2).

Telicota pythias bambusa Moore (7).

Genus **Oriens** Evans (= **Niceville**).

Oriens gola Moore (3).

Genus **Padraona** Moore.

Padraona dara pseudomaesa Moore (4).

Padraona maesoides maesoides Butler (1).

Genus **Halpe** Moore.

Halpe evershedi Evans (1).

Halpe moorei Watson (1).

Halpe homolea egena (Felder) (1).

Genus **Baracus** Moore.

Baracus vitatus subditus Moore (1).

Baracus hampsoni Elwes (1).

Subfamily 8. BAORINAE.

Genus **Baoris** Moore.

Baoris Kumara kumara Moore (1).

Baoris sinensis subochracea Moore (7).

Baoris mathias mathias Fabricius (7).

Baoris guttatus bada Moore (6).

Baoris zelleri colaca Moore (7).

Baoris bevani bevani Moore (1).

Subfamily 9. NOTOCRYPTINAE.

Genus **Notocrypta** De Niceville.

Notocrypta paralysos alysia Evans (1).

Notocrypta curvifascia (Felder) (4).

Genus **Udaspes** Moore.

Udaspes folus (Cramer) (5).

Genus **Sancus** De Niceville.

Sancus pulligo subfasciatus Moore (1).

Genus **Iambrix** Watson.

Iambrix salsala luteipalpus Plotz (2).

DESCRIPTIONS OF THE SPECIES.

Order LEPIDOPTERA.

Suborder RHOPALOCERA.

Family PAPILIONIDAE.

This family includes the butterflies popularly known as the Swallowtails. They are the largest and most brilliantly coloured among Indian butterflies. These butterflies are mostly blackish or dark brown, with varied markings of blue, green, yellow, red or other colours. The forewings are usually rather produced and elongated. Many species have their hind wings tailed.

The wings are very variable in shape. The hind wings are not channelled to receive the abdomen but their inner margins are turned upwards. In the male, the wing often bears a patch of specialised scales known as androconia or a brush of scented hairs.

The habits and methods of flight of the members of this family are very varied. They are mainly found in forest and hilly, wooded regions, but a few species are common on the plains.

Genus **Troides** Hübner.

This genus includes butterflies of large size commonly known as the Birdwings. Some species are remarkable for their brilliant colouring. This genus closely resembles *Polydorus* but in *Troides*, the subcostal vein of the forewing branches off from nearer the base and is longer.

Troides helena minos (Cramer).

The Common Birdwing.

Plate I. fig. 1.

Specimens in the collection : Two, South India: 145 mm. Both are females.

Description : ♂ The upperside of the forewing is glossy black. The veins 2, 3 and 4 are distinctly edged with whitish, these stripes being continued to the cell where they are united. The upperside of the hind wing is golden with black borders and veins. The inner area is black as far as the cell. The abdomen is brown above, narrowly ringed with yellow laterally, and yellowish beneath.

♀ This is much the same as the ♂ but the forewing bears prominent greyish white stripes along the veins and the upperside of the hind wing bears a discal row of large, triangular black spots. The broad, black outer border is strongly convex between the veins.

The abdomen is blackish brown with a broad yellow stripe at the sides.

Expanse : 140 - 180 mm.

Range : The range of the race *minos* (which alone is represented in the Museum collection) is Peninsular India, upto an altitude of about 6000 feet, but the range of the whole species extends to Ceylon, Sikkim to Orissa, Burma and Andaman Islands, where other races are found.

Habits : This is the largest of Indian butterflies. In South India it is only found on the western side of the southern hills. These butterflies begin to fly early in the morning. Soon after sunrise they feed on flowers. They feed again in the evenings, but rest or glide slowly around tree tops during the rest of the day. They are commonly found in jungle, but may also be found in open country.

Genus **Polydorus** Swainson.

(Formerly known as ***Byasa*** and ***Tros***)

This genus includes the butterflies popularly known as the Red-bodied Swallowtails. They are often distasteful to birds and other animals which therefore avoid them. Their larvae feed on plants of the family Aristolochiaceae. The wings are narrow and elongate and the ground colour is black or blackish with or without white or red markings on the forewing. In many species the hind wings bear tails. This genus is divided into a number of groups based on the wing characters and venation. The two species represented in the collection belong to the *Hector* group.

Hector Group.

♂ ♀: The forewing is elongate, broader in the ♀ than in the ♂ the costa is widely arched and the apex produced and rounded. The hind wing is elongate with an arched costa and scalloped termen. The hind wing is produced into a tail at vein 4.

Polydorus hector (Linnaeus)

The Crimson Rose.

Plate I, fig.2.

Specimens in the collection : Eleven, Madras; 95 mm.

Description : ♂ : The hind wings are tailed. Above, black; forewing with a broad, white interrupted band from the subcostal vein opposite the origin of veins 10 and 11 and a second similar subapical band.

♀ resembles the ♂ but the discal and submarginal markings are duller.

The hind wing bears, in both sexes, discal and marginal rows of posteriorly strongly curved series of seven crimson spots followed by a submarginal series of crimson lunules.

The abdomen is black above, with the black colour extending further towards the apex.

Expanse : ♂ ♀ : 90 - 110 mm.

Range : Bengal, Indian Peninsula and Ceylon.

Habits: This species in extremely common in the southern part of the Peninsula and all over the Western Ghats. It inhabits thick jungle as well as open country. It frequently visits flowers and on the hills it is found up to an altitude of 8000 feet during dry weather. At nights it rests gregariously on twigs and branches of trees.

Polydorus aristolochiae (Fabricius).

The common Rose.

Plate I, fig.3.

Specimens in the collection : Seven, Madras; 88mm.

Description : ♂ ♀ : The hind wing is tailed. The upperside is black. On the forewing the discal area is paler, with alternately black and pale stripes radiating from the margin of the cell. Hind wing with a spatulate tail, and with five elongate white spots (some of which may be absent). That in area I may be red. These spots are arranged around, but at some distance from, the lower end of the cell. In addition to these there is a marginal row of dull red crescent - shaped spots.

Expanse : 80 - 110 mm.

Range : India, Ceylon and Burma

Habits : This is perhaps the commonest, large-tailed butterfly found in India. It is very common all over the plains and seldom ascends more than 4000 feet in the hills. Like the preceding species, they roost gregariously on trees during nights.

Genus CHILASA Moore.

This is a group of mimetic butterflies resembling the Danaidae. The body is spotted with white. The hind wing at the base with a white dot or spot, usually also a spot of the same colour at the base of the forewing.

This genus is divided into two distinct groups, the *Agestor* group and the *Clytia* group. The former group is represented by species found in North India, Sikkim, Kashmir, and Burma. etc.,

The species represented in the Museum collection belong to the *Clytia* group.

PLATE I

Note : Some of the figures are drawn to natural size, but most of them are drawn slightly enlarged or reduced for the sake of convenience. In the case of species drawn to natural size, the words "natural size" are mentioned in brackets against the name of the species and in the case of species drawn enlarged or reduced the extent of magnification or reduction is indicated in brackets against the names of the respective species in the explanations to the plates. In cases where there is a marked difference in colour and pattern of markings of the wings between the dorsal and ventral sides, both dorsal and ventral views have been drawn, and in the case of species in which the male is strikingly different from the female, both male and female are figured. Unless otherwise stated, only the dorsal view is figured.

PLATE I

Fig. 1. *Troides helena minos* (Cramer) (x $^1/_2$).

" 2. *Polydorus hector* (Linnaeus) (x $^3/_4$).

" 3. *Polydorus aristolochiae* (Fabricius) (x $^3/_4$).

" 4. *Chilasa clytia clytia* (Linnaeus) form clytia Linnaeus (x $^3/_4$).

" 5. *Chilasa clytia clytia* (Linnaeus) form *dissimilis* Linnaeus (x $^3/_4$).

Chilasa clytia Linnaeus.

The Common Mime.

This species is widely distributed. It is generally found in large numbers at puddles on the sandy banks of streams, and also around flowers. In Southern India it is very plentiful in the monsoon months and spends the dry months in the pupa. It mimics *Euploea and Danais*

Range : Kangra to Sikkim, Assam and Burma; Bombay, Madhya Pradesh, South India and Ceylon.

The subspecies *Clytia* is represented in the Museum collection by the typical form clytia and by the form *dissimilis*. The clytia form mimics the Common Crow butterfly, *Euploea core core* and is generally more common than *dissimilis.*

Chilasa clytia clytia (Linnaeus).

This subspecies is subject to much variation and altogether six forms or varieties are known, of which only two, *clytia* and *dissimilis*, are represented in the Museum collection.

Chilasa clytia clytia (Linnaeus) form **clytia** Linnaeus.

Plate I, fig. 4.

Specimens in the collection : One, Trivandrum: 90 mm.

Unfortunately, the left forewing of this single specimen in the collection is missing.

Description : ♂ ♀ : The upperside is rich velvety dark brown. The upper forewing with marginal series of spots and a terminal series of spots between the veins. The upperside of the hind wings bear a discal series of long, arrow-shaped streaks, marginal crescents and narrow yellow or white terminal spots between the veins.

On the underside, the ground colour varies from soft pale brown to rich dark velvety brown. Forewing markings as above. Hind wing with similar markings as those above, but with a marginal row of comparatively large, very conspicuous yellow spots.

Expanse : 90 - 100 mm

Range : South India and Ceylon.

Habits : This form is generally more common that the next form, *dissimilis*, though in Ceylon the latter form is slightly more abundant. This butterfly inhabits the hilly regions at low elevations. The present form imitates the Common Crow butterfly, *Euploea core core* in appearance as well as in flight. Both this and the next form are commonest during the monsoon in Kanara, while in S. Nilgiris, they are commoner during the dry weather from February to April.

Chilasa clytia clytia (Linnaeus) form **dissimilis** Linnaeus

Plate I, fig. 5.

Specimens in the collection : Three, exact locality not recorded; 92 mm.

Description: The upperside of the forewing with four cell streaks coalescent at the base, of which one is thick and the other three narrow. Areas with long streaks and submarginal crescent-shaped pale cream-coloured markings. Hind wing with the cell white; long discal white streaks are present which reach quite up to the outer margin of the cell. Elongate streaks in areas 6 and 7 are continued anteriorly to the costa. Area 8 bears two spots and a slender costal streak. Submarginal and marginal markings as in form *clytia.*

Expanse : 90 - 100 mm.

Range : This form is widely distributed, occurring all over India, from Southern India to the North West Himalayas.

Habits : This form mimics the Blue Glassy Tiger butterfly, *Danais limniace.* The ♂ and ♀ are black above, with cream-coloured stripes and spots, disposed somewhat as in a blue *Danais* (except that the pale markings are not glossy). Specimens of both the above forms, *clytia* and *dissimilis* are found in hilly regions at low elevations. In South India, the maximum altitude at which they have been obtained appears to be 3000 feet. Both forms are commonest during the monsoon months.

Genus **Papilio** Linnaeus.

The members of this genus are chiefly citrus feeders. This genus differs from *Chilasa* essentially in the larva, which is comparatively smooth.

The *Castor* group of *Papilio* resembles Chilasa in having white dots on the body and a white spot at the base of the wings beneath. The other groups have white dots on the head and prothorax above and on the palpi, but none on the abdomen. Males are not mimetic, as a rule, but the females of a number of species mimic species of *Polydorus.* The flight is powerful. They are active and remain on the wing for a long time.

The genus *Papilio* is divided into a number of groups, of which the *Memmon, Paris, Helenus* and *Demoleus* groups are represented in the Museum collection.

The genus *Papilio* contains by far the greater number of species than any other genus of the family Papilionidae.

PLATE II

PLATE II

Fig. 1. *Papilio polymenstor polymenstor* Cramer (x $^3/_4$).

" 2. *Papilio paris tamilana* Moore (dorsal view, x $^3/_4$).

" 3. *Papilio paris tamilana* Moore (ventral view, x $^3/_4$).

MEMMON GROUP

Papilio polymenstor polymenstor Cramer.

The Blue Mormon.

Plate II. fig. 1.

Specimens in the collection : Six, South India; one of them is from Pulney Hills; 25 mm.

Description : ♂ ♀ : Upperside of forewing black, with a pale blue discal band which narrows down and becomes obsolete towards the apex. This pale blue band is traversed by black transverse stripes along the veins. The underside is opaque black with an elongate spot of dark red at the base of the cell in the forewing.

On the upperside of the hind wing, the basal quarter is black. The remaining distal three quarters of the wing is pale blue with a row of black discal spots, a similar row of black submarginal spots and a row of marginal black spots. Some of the submarginal spots coalescing with the marginal spots. The hind wings are tailless. The underside of the hind wings with five irregular small patches of red at the base.

The head, thorax and abdomen are uniformly blackish brown-an example of protective colouration, as the enemies of this butterfly are only attracted by the brightly coloured distal parts of the wings.

Expanse : 120 -150 mm.

Range: The range of the entire species extends over Ceylon, South India, Madhya Pradesh, S.Bihar, Bengal, Sikkim and Western Ghats; but the present race, *polymenstor* is found in Peninsular India as far north as Bengal. In South India, in the Nilgiris, it is found up to an altitude of 7000 feet.

Habits: This is the typical South Indian race, while the subspecies from Ceylon is *P. polymenstor parinda* (Moore). The flight of this butterfly is powerful and rapid, but it does not fly high as a rule. It frequently visits flowers. It is not found much on the plains or dry regions, but is most plentiful in evergreen jungles. It is found in the Nilgiris between 2000 and 5000 feet, but may ascend to 7000 feet in dry weather.

PARIS GROUP

This group includes the butterflies known popularly as the Blue Peacocks. They are tailed. The ground colour is black dusted with golden green scales on the upperside. The upperside of the hind wing with a blue or green discal band and a prominent tornal red ring enclosing a black centre.

Papilio paris tamilana Moore.

The Paris Peacock.

Plate II, figs. 2 & 3.

Specimens in the collection: Three, South India; 117 mm.

Description : ♂ ♀ : The upperside of the forewing is almost completely black, with a green discal band which is short and narrow, often faint or absent altogether. The upperside of the body and wings dusted with green. The upperside of the hind wing, with a large, bright green or blue, sharply defined patch, evenly and convexly curved at the inner edge. There is a red annular tornal ring. No other marginal spots are present, The large bluish or greenish patch is connected with the inner margin by a narrow green band.

The underside is brownish black. On the underside, the forewing bears a series of close-set grey discal stripes which do not reach the end of the cell. Hind wing with a complete row of red or yellowish red lunular rings enclosing with them oval, purplish blue spots.

The hind wing bears a prominent, club-shaped tail.

Expanse : 120 -140 mm.

Range : Peninsular India.

Habits : This is one of the most beautiful of South Indian butterflies, very common in wooded districts at lower elevations, but never found lower than 1000 feet. Their flight is very swift. The females are rarely seen. The present subspecies is the South Indian form. It is not uncommon in the Nilgiris from 3000 to 7000 feet in April and June.

Papilio Crino Fabricius.

The Common Banded Peacock.

Plate III, figs. 1 & 2.

Specimens in the collection : Three, South India; 82 mm.

Description : ♂ ♀ : The upperside of the wings uniformly dusted with green scales. A green, post-discal band is present in both wings. The tail is tipped with green. In the forewing, the bluish green discal band is clearly defined and narrows towards the costa, and slightly curved and sinuous. In the hind wing, there is a broad bluish green post-discal band, inwardly clearly defined and not entering the cell. Above vein 7 it is abruptly narrowed. Its inner edge is fairly straight, while its outer edge is convexly curved. There is a red tornal ocellus enclosing a black centre inwardly edged with blue.

The underside is dull pale brown to blackish brown irrorated with scattered yellowish scales which, on the forewing, are absent from a large, triangular discal patch. Hind wing

PLATE III

PLATE III

Fig. 1. *Papilio crino* Fabricius (dorsal view, x $^3/_4$).

" 2. *Papilio crino* Fabricius (ventral view, x $^3/_4$).

" 3. *Papilio buddha* Westwood (x $^3/_4$).

" 4. *Papilio dravidarum* Wood-Mason (x $^3/_4$).

" 5. *Papilio helenus daksha* Moore (dorsal view, x $^3/_4$).

with the tornal ocellus much as on the upperside. Also with an obscure, strongly arched post-discal band.

Expanse: 80 - 100 mm.

Range : Ceylon, parts of Peninsular India and Lower Bengal.

Habits : This species is fairly common on the plains. In the Nilgiris it may be met with below 2000 - 3000 feet. In South India it flies throughout the year, but is commonest in July. It ascends to about 6000 feet on the hills. Its flight is very swift. This species is said to be migratory. The food plant of the larva is the Satinwood tree.

Papilio buddha Westwood.

The Malabar Banded Peacock.

Plate III, fig. 3.

Specimens in the collection : One, locality not recorded; 100 mm.

Description : ♂ ♀ : The upperside of both the wings bears a broad bluish green discal band which enters the cell extensively in both the wings. This band is broader and enters the cell more broadly on the hind wing. The basal areas of both the wings are dusted with green scales. The outer marginal areas and the tail are black. The hind wing bears a yellow submarginal spot on the costal margin and a similar crescentic yellow mark at the tornal angle.

The underside of the forewing bears a broad, post-discal grey band. The hind wing bears a pale marginal border and a series of narrow, yellow submarginal spots.

Expanse : 90 - 100 mm.

Range : The Western Ghats.

Habits : This is one of the most beautiful of Indian butterflies. It is confined to the wooded regions of the Western Ghats where the rainfall is heavy. It is common on the hills near the sea at lower elevations below 2500 feet. Its flight is extremely swift and it often keeps to the tops of trees. The females are seldom seen. This species is common on the western slopes of the Nilgiris.

CASTOR GROUP

Black or blackish brown butterflies, with white markings. Tailless. Mimics of Danaids.

Papilio dravidarum Wood Mason.

The Malabar Raven.

Plate III, fig. 4.

Specimens in the collection : One, South India; 93 mm.

Description : ♂ ♀: Upperside velvety blackish brown. The upperside of the forewing with the outer half and four indistinct longitudinal lines in the cell irrorated with yellowish brown scales. A small white spot is present across the middle discocellular. A submarginal series of inwardly conical white spots and a marginal series of white spots which decrease in size and completely disappear towards the apex.

The upperside of the hind wing with a discal series of arrow-shaped white spots (outwardly emarginate), and a marginal series of elongate white lunular spots of the black ground colour in between.

The ground colour of the underside is a rich hair brown with larger markings than above. Head, thorax and abdomen dark brownish black. Head and abdomen minutely speckled with white, the white specklings being larger and more numerous below. This butterfly is tailless.

Expanse: 80 - 100 mm.

Range : Peninsular India, Wèstern Ghats.

Habits : This is a rather rare species confined to the heavy jungles of the Western Ghats between 1000 and 3000 feet. It mimics the Common Indian Crow butterfly, *Euploea core core* and the Common Mime, *Chilasa clytia clytia*. The male is usually commoner. This species is fairly common in Coorg and on the western slopes of the Nilgiris.

HELENUS GROUP

Tailed. Black above, with a white or cream-coloured discal band or patch on the hind wing.

Papilio helenus Linnaeus.

This is a common species occurring especially in high jungle. Most abundant in low elevations but occurs on the hills up to an altitude of 6000 feet.

Three subspecies are found in the Indian Region. Of these, the one found in South India is *Papilio helena daksha*. This is the subspecies in which the specimens reach the largest size for this species.

Papilio helena daksha Moore.

The Red Helen.

Plate III, Fig. 5, and Plate IV, fig. 1.

Specimens in the collection: Eight : of these, two are from Pulneys, one from the Nilgiris, one from the Netterikal Region, Kalakkad Forest, Tirunelveli District and one from Cochin. The remaining three are from South India, but the exact locality is not recorded; 115 mm. The specimens are large, one of the specimens from the Pulneys being the largest, measuring 135 mm., which is 5 mm. more than the largest recorded expanse for this subspecies.

Description : ♂ ♀ : The upperside of the hind wing with a large, creamy white discal patch in areas 5, 6, and 7 An obscure series of claret-red crescent -shaped spots along the lower margin, but these spot may sometimes be absent. Extreme margin tipped with white, inwardly convex, crescent-shapped linear spots.

The upperside of the forewing is more or less uniformly blackish brown, but the outer half is slightly paler. The underside of the forewing with the grey, internervular streaks forming a broad, transverse discal series widening considerably towards the costa, but posteriorly not extending to the outer margin. The underside of the hind wing with a complete row of marginal red crescents.

Expanse : 118 - 140 mm.

Range : Peninsular India : Western Ghats, Nilgiris, Palnis, Shevroys, Coorg and Bangalore.

Habits : This species inhabits evergreen jungles in regions of heavy rainfall. Its flight is rapid, but it flies low and keeps entirely to the protection of trees. When it rests, it often keeps the hind wings horizontally and with the forewing drawn over the hind wing and hiding the white patch. In this position, therefore it is not very easily seen. But in flight it is a very striking butterfly, the white patch on the hind wing being very conspicuous. It is commonest during the monsoon months. In South India, it is found throughout the year, between 1000 and 7000 feet.

Papilio polytes Linnaeus.

A very interesting species of wide distribution. The female mimics species of *Polydorus hetor*. The South Indian race, *romulus*, is represented in the collection.

Papilio polytes romulus Cramer.

The Common Mormon.

Plate IV, fig. 2 & 3.

Specimens in the colletion : Eight (five male and three female), South India; 80 mm. The smallest specimen from Madras measures only 63 mm. (17 mm. less than the minimum recorded expanse for this subspecies).

Description : ♂ : Tailed. The upperside of the forewing is black, with a terminal series of white spots which gradually become narrower towards the apical end of the wing. The upperside of the hind wing with a transverse discal series of elongate white spots from the inner margin to area 7, these spots being divided by the black veins and followed by sparse blue scales on post-discal area.

The underside is similar to the above, but with duller ground colour. Hind wing with the discal series of white spots and blue scaling followed by a submarginal series of smale, dull reddish white lunules and a row of narrow, linear, curved white marginal spots. The tornal spot is separated from the blue-scaled area by an ochre-coloured line.

♀ : (*form stichius* which alone is represented in the collection). This mimics the Common Rose, *Polydorus aristolochiae* very closely.

On the upperside, the forewing is crossed obliquely from the middle of the cell to the tornal angle by a broad white band somewhat as in *polydorus hector*. The edges of this band are not well defined. This is followed by an ill defined white patch beyond the apex of the cell.

Hind wing with two or six discal elongate white spots and often with one in the apex of the cell. The lower half of area 1 is dark red, irrorated with blue scales and with a superposed black tornal spot. A submarginal series of red lunules (these are much redder than in *Polydorus aristolochiae* and a series of paler red marginal spots in the posterior interspaces are present.

The underside is similar to the upperside; the underside of the hind wing bears a complete series of outer marginal spots.

In both the sexes, the antennae, head, thorax and abdomen are black, but the head and thorax are spotted above anteriorly with white and the whole body below spotted with white.

Expanse : 90 - 100 mm.

Range : India, Burma and Ceylon; also extending to Malay Peninsula and the Celebes.

Habits : The Common Morthon sometimes exhibits striking differences from the normal form.

They are known as aberrations. This species prefers lightly wooded country but is commonly met with throughout the year, over the plains and also on the hills up to a considerale height. The male is a common visitor in gardens and flies fast close to the ground .

Of the females, the form *stichius* is the commonest. This species is very common on Barkuda Island, Orissa, where all the three forms of the female have been collected.

The form of the female which is common in and around Madras is *stichius*. The form *cyrus* is the rarest, but it has also been recorded around Madras City.

DEMOLEUS GROUP

This group includes butterflies with black and yellow colours predominating. Base of cell on the underside of the forewing striped with pale yellow. A large central area in the hind wing pale yellow.

Papilio demoleus demoleus Linnaeus.

The Lime Butterfly.

Plate IV, figs. 4 & 5.

Specimens in the collection : Fourteen, of which three have their wings broken. Of these, two are from Pulneys, one from Godavari and the rest from Madras. The specimen originally labelled as *P.demoleus liomedon* was also found to belong to the present species on scrutiny. 82 mm.

Description : ♂ ♀ : The upperside is black. Hind wing with a broad, irregular yellow discal band. Forewing with large, irregular yellow spots and patches. Forewing with the base below cell and basal half of the latter irrorated with yellow scales so as to form more or less complete yellow dotted transverse lines. A curved yellow spot is present at the upper apex of the cell in the forewing. Marginal and terminal rows of yellow spots present on both wings, the marginal spots in the hind wing being broadly crescent-shaped, the concavities facing outwards. The hind wing bears a red tornal spot and apical black and blue spot.

The underside is of the same ground colour as the upperside, but with paler and much larger markings. Forewing with cream-coloured lines over the basal half of cell and the base of wing below it. These lines coalesce at the base. Hind wing marked with large, pale cream-coloured patches reducing the black ground colour to narrow interspaces. The ocellus in area 7, the apex of the cell and the black ground colour between the discal and post-discal markings in areas 2 to 6 margined with blue and tinted ochraceous centrally.

Antennae dark reddish brown, and head, thorax and abdomen dusky black. Palpi and lower surface of thorax and abdomen cream-yellow, the abdomen with fine lateral, longitudinal black lines.

Expanse : 80-100 mm.

Range : Ceylon, whole of India, up to Northern Burma. Also extending to Persia and Arabia.

Habits : This is a large, tailless, brightly coloured butterfly and is one of the commonest species found in the plains. It may be seen visiting flowers in large numbers during the monsoon. It ascends up the hills up to an altitude of 7000 feet in the Himalayas. It is essentially a plains species, flying low at all seasons. The food plants of the larvae are often citrus trees.

Papilio demoleus demoleus form *demoleinus* Ob. : At least two specimens in the collection (locality, Madras) appear assignable to the form *demoleinus*. In this form, the red tornal spot of the hind wing is reduced proximally, and separated from the blue lunule by a black spot.

TRIBE GRAPHINI

The members of this tribe are popularly known as Kite Swallowtails or Swordtails, as the narrow, long, pointed tails present a sword-like appearance.

The antennae are moderately short, with a stout club. Wings often thinly scaled, semitransparent. The greenish and bluish bands and spots on the upper surface mostly without scales. Forewing in most species of *Graphium* with vein 11 connected with vein 12.

Genus **Graphium** Scopoli

(formerly **Pathysa** Reakirt).

Characters of the genus more or less the same as those mentioned for the Tribe above.

The species of this genus are assigned to four distinct groups, depending on the length and shape of the tail, the nature of the veins and other characters.

Both the species represented in the collection of this Museum belong to the "Antiphates" group.

ANTIPHATES GROUP

Forewing with vein 11 running into vein 12. Wings white with black bands. Tails long, gradually pointed. A well marked cottony scent organ in the abdominal fold present in certain species.

Six Indian species are included in this group. Of these only subspecies of two species are found in Southern and Peninsular India, and these are the only ones represented in the Museum collection.

PLATE IV

PLATE IV

Fig 1. *Papilio helenus daksha* Moore (ventral view, x $^3/_4$).

" 2. *Papilio polytes romulus* Cramer (Male, x $^3/_4$).

" 3. *Papilio polytes romulus* Cramer (Female, x $^3/_4$).

" 4. *Papilio demoleus demoleus* Moore (x $^3/_4$) (slightly faded specimen, originally labelled as *Papilio demoleus liomedon* Moore).

" 5. *Papilio demoleus demoleus* Moore (x $^3/_4$) (fresher specimen).

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Graphium nomius nomius (Esper).

The Sport Swordtail.

Plate V, Fig. 1.

Specimens in the collection : One, locality not recorded ; 80 mm.

Description : ♂ ♀ : Upperside bluish white (faded in the present specimen). Forewing marked by five broad, black bands (faded into dark brown in the present specimen) and with a very broad, black margin occupying about one third of the width of the wing. This broad black band is traversed by a submarginal series of small spots of the ground colour, of which the anterior ones are rounded and the others more or less crescent-shaped. Hind wing with the ground colour whitish along the inner margin. A marginal streak and two black transverse bands running across the cell from the costa. The bands are joined near the tornus by transverse crescent-shaped black markings. A very broad, black marginal band present on the outer margin of the wing, this band being traversed by a series of narrow whitish crescents. A small black spot present in area 1 above tornus, but the second black spot said to be present in this species at the base of area 4 is absent in the single specimen represented in the collection. The tail is black, edged with white, and white at the tip.

Underside white, with the markings brownish instead of black. In the hind wing, the inner discal band broken and irregular, black and bordered with a series of red spots edged with black on the outer side.

The male has a cottony scent wool in the dorsal fold.

Expanse : 75 - 90 mm.

Range : Ceylon, Peninsular India, and extending north wards to Sikkim, Assam and Burma. Not rare.

Habits : This is a widely distributed species, occuring all over India, and along the Himalayas up to Simla. It is usually found below 3000 feet and migrates locally in certain parts. It frequents different kinds of habitats in different localities. It is generally gregarious, often found setting in large numbers on wet mud. Its flight is low, but steady and rapid.

Graphium antiphates naira (Moore).

The Fivebar Swordtail.

Plate V, Fig. 2.

Specimens in the collection : One. This belongs to the wet season form, which is the nominotypical form of this species; 84 mm.

Description : ♂ ♀: Upperside with forewing traversed by five short, black bands of which the basal extends to the inner margin, the subbasal band into area 1 and third and fourth to the edge of the cell. The fifth band is broad and triangular, with its apex terminating at the lower angle of the cell. Beyond these are the broad, post-discal and marginal black bands which extend from costa to tornal angle, the two bands coalescing below vein 4 and narrowing down to a blunt point at the tornal angle. Short, pale green bands intervene between the cellular apical, post-discal and marginal black bands.

Hind wing uniformly white over its greater area, the black markings of the underside showing through as dull grey patches. The peripheral one-fourth of the surface brownish grey, traversed by a series of curved black lunules ending in a tornal black spot. A marginal black band present, following closely the curved indentations on the margin of the wing. Tail blackish brown, edged and tipped with white.

The underside of the forewing is similar to the upper-side, but the green tinge over the white parts in the cellular area is more pronounced. The discal and marginal black bands are not joined posteriorly.

The markings on the underside of the hind wing are rather elaborate. The basal half is green and the distal half white. A large, black tornal spot is present. A black line is present along the inner margin and curving above the tornal spot outwards. A straight, sub-basal black band and a broader black band extending from costa, and an irregular discal series of black markings' curved inwards posteriorly towards the tornal spot present. A submarginal series of very small, slender, black, crescent-shaped spots in pairs and a series of short, marginal black bars present.

Expanse : 80 - 95 mm.

Range : Peninsular India. Common in the wet season. The female is rare.

Habits : This species is most abundant in the monsoon months. It has a quick, graceful flight, and may be seen circling around tree tops and frequently settling on patches of moist sand. It frequents wet, evergreen forests and keeps to low elevations.

EURYPYLUS GROUP

Graphium sarpedon teredon (C & R. Felder)

(formerly **Zetides sarpedon teredon** (Linnaeus).

The Common Bluebottle.

Plate V, fig. 3.

Specimens in the collection : Eleven; Trichur, Wynaad, South Coorg, Palnis, Kalakkad forest, Netterikkal Region, Tirunelveli District; 76 mm.

Description: ♂ ♀ : *Upperside:* Brownish black, with a greenish blue discal band. The band is narrowed anteriorly and separated into spots towards the apex and on the hind wing it is more strongly narrowed posteriorly and ending in a point near the anal

PLATE V

PLATE V

Fig. 1. *Graphium nomius nomius* (Esper) (x $^3/_4$).

" 2. *Graphium antiphates naira* (Moore) (x $^3/_4$).

" 3. *Graphium sarpedon teredon* (C & R. Felder) (x $^3/_4$).

" 4. *Graphium doson eleius* (Fruhstorfer) (x $^3/_4$).

" 5. *Graphium agamemnon menides* (Fruhstorfer) (x $^3/_4$).

" 6. *Graphium cloanthus* (Westwood) (x $^3/_4$).

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angle. Hind wing with the costal part of the band scaled with white. The hind wing also bears a row of narrow green submarginal lunules. The scent fold on the inner margin of the hind wing is grey on the inside and furnished with a tuft of long, somewhat stiff, white hairs.

On the underside, the ground colour is paler, the discal band scaled with transparent whitish. Forewing with faint indications of submarginal spots. The hind wing, near the base, bears a red transverse bar, extending from the costal margin to the cell and is separated from the discal band by a dark patch. Five red discal spots are present, of which the foremost one surrounds the apex of the cell.

Body brownish black above covered with dark grey hairs, and below mostly pale grey.

This subspecies is distinguihed from the typical form of the species by the narrower discal band on both wings. Hind wing more strongly produced at the apex of vein 4, where it forms a strong, outwardly projecting tooth. On the forewing, the small, greenish spot nearest the apex is sometimes reduced or absent.

Expanse : 80 - 90 mm.

Range: The species *Graphium sarpedon* is represented by two subspecies in the Indian Region. Of these, *G. Sarpedon teredon* occurs in Ceylon and Peninsular India and is fairly common, The other subspecies, *G. Sarpedon* sarpedon ranges from Kashmir to Burma.

Habits : This species is endowed with very strong powers of flight which is typically skipping. It occurs in wooded districts as well as in more open country and is very common in gardens and woods. It settles on wet patches of sand, but is more vary than the preceding species and stays only for a short while in one spot when it does so. It keeps more to open and sunny places and is frequently found hovering around flowers. When resting, it keeps its wings closed. It is commonest at low elevations, but has been collected on tops of South Indian hills. The specimens in the collection from Kalakkad forest are from an altitude of about 300ν feet.

(Note :- In the figure given by Winter-Blyth, Butterflies of the Indian Region, Plate 58, fig. 3 the discal patch is shown as bluish and bluish white while actually in the specimens in the Museum collection, the discal bands are more or less completely vivid green, there being very little blue in them. The submarginal lunules are also green in the present specimens, while they appear blue in the said figure).

Graphium doson eleius (Fruhstorfer)

The Common Jay.

Plate V, fig.4.

Speimens in the collection: Ten, Madras, Nilgiris and South Coorg. The Ceylon form is G. doson doson which is the nominotypical form of this species; 74 mm.

Description: ♂ ♀ : The upperside is black (but faded into blackish brown in all the specimens in the collection). The forewing bears three slender, oblique, short, pale green streaks in the basal half of the cell and two irregular, similarly coloured spots near its apex. A broad, discal, pale green band composed of spots that gradually diminish in size anteriorly, is present. This band extends from near the apex of the forewing nearly to the dorsum of the hind wing.

Both wings have a marginal series of small green spots. This form differs only slightly from the typical form, *Graphium doson doson* from Ceylon. In the form *G. doson eleius*, the green spots in the apical half of the upperside of the forewing are somewhat more yellowish and the discal band is somewhat broader. In the preserved specimens in the Museum collection, all the spots and bands have faded into yellowish.

The underside is brownish black, with the markings more or less similar, but larger and with more diffuse edges. The underside of the hind wing with a white basal streak extending half way down the inner margin.

The male bears a yellow scent wool in the dorsal fold reaching the inner marginal dark stripe.

Expanse : 70 - 80 mm.

Range : Southern India to Bengal.

Habits : This is a common form, although much less common than the preceding species and keeps more to damp, wooded areas at low elevations. Its flight is much weaker than that of the preceding species.

Graphium agamemnon menides (Fruhstorfer)

The Tailed Jay.

Plate V. fig. 5

Specimens in the collection : Eight, Madras, South India; 94 mm

Description : ♂ ♀ : The upperside is brownish black, with large, bright bluish green patches, which are narrow and band-like towards the base and large and elliptical below the cell of the forewing. In the hind wing the spots are considerably smaller. The hind wing bears a stumpy tail, which, in this subspecies, is longer than in the typical form. The underside is paler and tinged with violet grey. The green patches are partly covered with white or brownish scales. The hind wing on the underside bears a charateristic black, crescent-shaped spot basally margined with red. There is another similar, but more solid spot below the first one; there is also a red anal spot. The body is brownish black above and greyish beneath, with a greyish green lateral stripe. In the preserved specimens, except in one specimen, in which the spots and bands are greenish, they have turned yellowish.

Expanse : 85 - 100 mm.

Range : Ceylon and Peninsular India.

Habits : This is a common species ascending the hills to about 7000 feet and keeps to well wooded country and is more or less similar to *Graphium sarpedon* in its habits.

Graphium Cloanthus (Westwood).

The Glassy Bluebottle.

Plate V, fig. 6.

Specimens in the collection : One, Northern India. The specimen is blackish brown with the coloured patches and broad, discal band faded into a very pale, whitish green; 70 mm.

Description : ♂ ♀ : The upperside of the wings is black with broad, green bands. The forewing bears two large cell patches and a broad, discal band which is continued on the hind wing in the form of a triangle. The hind wing also bears four greenish submarginal D-shaped patches and a faint, slender streak above this series. The borders are black except for the dorsum of the forewing and costa of the hind wing which are dull brownish. The spots and bands are pale transparent green in the living speimen, but turn opaque whitish in the preserved specimens.

The underside of the forewing bears a pale submarginal band along the black border. The green patches and discal band look more glassy and trasparent on the underside in the preserved specimen. The underside of the hind wing bears a red line at the base and small, black-edged red, linear spots from the end of the cell to the anal angle.

The body is brownish black, above, and paler brown beneath. The tail is more slender and pointed than in the preceding species. The tail is well developed in both the male and the female.

Expanse : 85 - 95 mm.

Range : Formosa and China to Northern India. Only the nominotypical form to which the present specimen belongs, enters the Indian area.

Habits : This form, namely, *Graphium cloanthus cloanthus* ranges from Kashmir to Assam and Burma. It occurs in the hills up to an altitude of 9000 feet. It is most abundant during and after the rains. Its flight is rapid and it frequently circles round tree tops and settles on patches of damp sand.

Family PIERIDAE

This family includes small to moderate-sized butterflies which are almost always white or some shade of yellow or orange with black markings. The hind wings are never tailed, but are channelled at the inner margin to fit the abdomen. In both the wings, the

cell is closed. The venations is rather variable, being more so in the forewing. The legs are fully developed, with the claws bifid.

This family is divided into four subfamilies, but only two subfamilies are represented in the Indian region, namely, the *Pierinae*, including the "Whites " in which the predominant colour is white, and hind wing bears a well develooped precostal vein, and the palpi are always hairy, and the *Colladinae*, including the "Yellows", in which the predominating colours are as a rule yellow or orange, and the precostal vein on the hind wing is either absent or very short and directed basally, and the palpi are usually not hairy.

Butterflies of this family migrate in large numbers, literally forming clouds in the air. They are cosmopolitan in distribution, being found in all parts of the world, including the cold arctic regions, the scorching desert areas and the tropical forests.

Subfamily PIERINAE.

The Whites.

The hind wing bears a well developed precostal vein which is directed distally. The forewing bears 10 to 12 veins. This subfamily includes the butterflies popularly known as the whites in which the predominant colour is white, with black spots, although there are exceptions.

This subfamily may be divided into two groups, namely, (1) in which in the forewing the vein 6 branches off from vein 7 and (2) in which the vein 6 is given off from the upper angle of the cell or just above it. Of these two groups, the first one includes by far the greater number of genera represented in the collection.

Genus **Leptosia** HÜbner

Leptosia is a genus of fairly small butterflies with a wing span of about 35 to 50 mm. In the forewing, the costa is slightly arched. The apex of the forewing is very broad and rounded. The outer margin of the forewing is convex. In the hind wing, the costa is very slightly arched. The outer margin of the hind wing is strongly arched. The inner margin is straight or slightly arched. The body is slender and the eyes are naked.

The single species, *Leptosia nina nina* occurring in the Indian region is well represented in the Museum collection.

Leptosia nina nina (Fabricius).

The Psyche.

Plate VI, fig. 1.

Specimens in the collection : Nine, Madras, South India, of which one is incomplete, with one of the forewings broken; 40 mm.

Description : ♂ ♀ : The upperside is white, with the bases of the wings faintly powdered with minute black scales. The forewing bears at its apex and outer margin a black border to vein 3, broader at the apex. A very large and conspicuous black discal spot is present. The hind wing is uniformly whitish, often with an obscure, fine marginal black line.

The underside is white. On the underside, the costal margin and apex of the forewing are broadly streaked with green striae. The whole surface of the hind wing is also streaked similarly with slender, transverse greenish striae and minute dots. The underside of the forewing with the post-discal black spots as on the upperside. The outer margins of both wings bear minute short black lines at the terminations of the veins.

In the female, the black markings on the upper-side of the forewing are usually slightly broader. The head is brownish, the thorax and abdomen being white.

Expanse : 35 - 50 mm.

Range : Ceylon, Peninsular India to Mussooree, Burma and Andaman Islands.

Habits : This is a delicate butterfly with very weak powers of flight. It is a common species found fluttering among the undergrowth of scrub or jungle, seldom rising to more than two feet above the ground.

Genus **Aporia** Hübner.

The Blackveins.

The genus include large, white butterflies with black veins, hence the popular name, Blackveins. The wings are long and rounded. In the forewing, the costa are very slightly arched. The apex is blunt, the outer margin convex and the inner margin straight. The hind wing is comparatively long, narrow and more or less pear-shaped. The cell is elongate in both the wings.

This genus is widely distributed occuring over the whole of the Palaearctic Region, excepting North America. In India, this genus occurs on the Himalayas and the hills of Assam.

Of the two species represented in the Museum collection, one, namely, *Aporia craetaegi* Lamarck (of which there are two specimens in the collection, 65 mm.), is a European species with whitish, somewhat semitransparent wings bearing distinct black veins. (Plate VI, fig. 2).

The other species, *Aporia leucodice* is represented in the collection by a single specimen belonging to the subspecies *soracta* Moore.

Aporia leucodice soracta Moore.

The Himalayan Blackvein.

Plate VI, fig. 3.

Specimens in the collection : One, Himalayas; 60 mm.

Description : ♂ ♀: The wings are white with black veins. On the upperside, the wings, are milky white. The forewings bears a post-discal band which is usually obsolete in area 3. A heavy discocellular bar and a thin marginal black line extending from base of costa to base of inner margin are present. The base is slightly powdered with black scaling. The hind wing is without any markings, except for a marginal black line as on the forewing. A more or less faint discal line or of arrow-shapped markings is also present.

On the underside, the forewing is white, with the apex and costal edge pale yellow. The black markings are as on the upperside. the underside of the hind wing is pale yellow, the precostal area being bright yellow. Discal band is often absent on the underside of the hind wing. The head, thorax and abdomen are white, suffused with black above and white below. The antennae are black.

The female is, as a rule, more heavily marked.

Expanse : 50 - 70 mm.

Range : Kashmir to United Provinces (Uttar Pradesh). Also Mussooree in the Himalayas

Habits : This is a common species found at elevations between 4000 and 10,000 feet, and is most abundant during May and June. This butterfly frequents flowers of the Horse Chestnut. It may be seen feeding in large numbers on these blossoms. It is not found at elevations lower than 3000 feet, nor after the advent of the rains. In the single specimen in the collection, both wings have diffuse pale brown markings towards their bases.

Genus **Delias** Hübner.

This genus includes butterflies popularly known as the Jezebels. They attain a fairly large size and are remarkable for their boldly marked venation and the presence of bright, black, red and yellow markings on the underside of the hind wing. The upperside is usually whitish with some or all of the veins marked black or blackish with white or yellow markings. The apex of the forewing is broadly rounded and its outer margin is oblique. The inner margin is straight. The cell is long and occupies about half the length of the wing. In the hind wing, the cell is regularly oval and is a little more than half the length of the wing. Scent scales are found on the forewing in all species and assume different shapes which are of classificatory value.

These butterflies are slow in flight and frequent grassy meadows and open country from 2500 to 8000 feet. They haunt flowering trees and shrubs. They are usually seen flying high around trees and shrubs containing the mistletoe, *(Loranthus)* which is their food plant, growing parasitically on other trees and shrubs. All the species have the hind wing more or less brightly coloured on the underside,and in some cases the upperside

PLATE VI

PLATE VI

Fig. 1. *Leptosia nina nina* (Fabricius) (x 1 ½).

" 2. *Aporia craetegi* Lamarck (European species: natural size).

" 3. *Aporia leucodice soracta* Moore (natural size).

" 4. *Delias eucharis* Drury (dorsalview, x $^3/_4$).

" 5. *Delias euchairs* Drury (ventral view, x $^3/_4$).

" 6. *Delias thysbe kandha* Doherty (dorsal view, x $^3/_4$).

" 7. *Delias thysbe kandha* Doherty (ventral view, x $^3/_4$).

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of the forewing or of both the wings is also brightly coloured. A number of species of *Delias* are mimicked by other species of this family.

Of the thirteen species found in the Indian Region, only three species are represented in the Museum collection.

Delias eucharis Drury.

The Common Jezebel.

Plate VI, figs. 4 & 5.

Specimens in the collection : Ten, from various localities in South India, such as Godavari, Wynaad and Trichur; 72 mm.

Description : This species may be easily distinguished by the presence of submarginal row of large, brick-red spots on the underside of the hind wing. It is one of the commonest and most familiar of the Indian species of Delias and is noted for the beauty of its colouration and pattern of venation.

♂ : The upperside is white, with black veins, and a black outer discal band on both the wings. This submarginal line is angulated at vein 5. This line separates off a submarginal row of seven white spots and a narrow apical patch. These spots are narrowed on the outside. In the hind wing, on the upper surface the veins are, as a rule, not blackened within the submarginal line, but in one specimen in the line. Museum collection they are blackened throughout an as boldly marked as on the forewing. The marginal spots on the hind wing are slightly pink owing to the fact that the red colour shows through from the under surface. Veins Ib to 6 are blackened from the submarginal line to the outer margin, and each of these veins terminates in a small black triangular marginal spot.

The underside of the forewing is white, with all the veins heavily blackened. The submarginal vein is much more heavily marked than on the upperside. The submarginal spots are all white or the three uppermost alone may be yellow. On the underside of the hind wing all veins are blackened, and there is a heavy submarginal line. The area within this line is yellow, but area 5 is usually white and area 6 is partly white in some specimens. The marginal area is ornamented with six large, brick-red spots each edged with a diffuse border of dull white. The spots are squarish or subtriangular the pointed end being directed distally and touching the margin. A small anal spot is present in area 1 b. The marginal area between the spots, representing the terminations of the veins, is black.

♀: The upperside is white, with all the veins heavily blackened. The wings are often tinged with yellow and pink. The forewing is greyish white, with the submarginal line much more heavily marked than in the male, the spots being slightly smaller. The hind wing bears a conspicuous row of six submarginal spots, white, tinged with pink.

The underside resembles that of the male. The subapical spots in the forewing are yellow. In some specimens the ground colour of the forewing is yellowish. In the hind

wing the veins are slightly more heavily blackened than in the male. As variations, very dark specimens are sometimes met with, in which the lighter patches on the forewing are reduced. There is considerable individual variation in this species

Expanse : 66 - 83 mm.

Range : Ceylon and Peninsular India, as far north as the lower slopes of the Himalayas, also North Burma. It is said to be abundant in ceylon up to an altitude of 4000 feet.

Habits : This is a common species, the larvae of which live voraciously on the leaves of species of Loranthus, growing on various trees such as the Mango and other leguminous plants. Their flight is weak. They may be often seen fluttering about slownly high up near the tree tops among the leaves looking for their foodplants. They may also be seen resting with the wings closed on wet patches of sand on the roadside or on river beds. This species is closely mimicked by *Prioneris sita* (C..& R. Felder).

Delias thysbe kandha Doherty.

The Red-breast jazebel.

Plate VI, figs. 6&7,

Specimens in the collection : Three, Vizagapatnam; 76 mm. In one of these, the left hind wing is slightly broken and incomplete. The average expanse of tyhese specemens (76 mm.) is 4 mm less than minimum recorded expanse for this species.

Description : This species is easily distinguished by the presence of a large, red basal area on the hind wing.

♂ ♀ The upperside of the forewing with ashy grey markings on a blackish brown ground. The ashy grey markings are larger and the dark areas are also smaller and more sharply defined than in *Delias thysbe pyramus* which occurs in Northern India (Nepal and Assam) and Burma, The upperside of the forewing bears sub-apical streaks which are obscurely tinged with ochreous brown.

Hind wing with a large red basal area, its distal edge being heavily bordered with black. The area beyond this basal red area is pale cream-coloured with the prominent black veins terminating in the expanded black areas on the margin.

The underside of the hind wing with the discal markings and inner area almost uniform bright yellow, approaching a brilliant lemon yellow. The basal red area is as bright as on the upper surface. The ochraceous spot at the base is large and distinct.

Expase : 80 - 100

Range : South India.

Habits : This is a rather rare subspecies, and has been recorded only from the Eastern Ghats between 3000 and 5000 feet in the Vizagapatnam District. Its habits are much the same as those of the genus in general. It is one of the most brightly colourd forms of delias met with in India.

Delias descombesi leucacantha Fruhstorfer.

The Red spot Jezebel.

Plate VII, figs. 1 & 2.

Specimens in the collection : One fairly large male specimen from the Himalayas, but its exact locality is not known; (80 mm.)

Description : ♂ : The upperside is white with the costa and termen of the forewing narrowly black. The apex is more broadly black, the black apical area extending on the margin up to about vein 4. In some specimens this apical area may be bluish white owing to the admixture of white scaling. The hind wing is white, except for some thin marginal black markings in most specimens.

The underside of the forewing is black, with strongly developed white vein streaks. A narrow discocellular white bar, three subapical white stripes and four submarginal white spots are present. The underside of the hind wing is bright yellow, with a broad, subcostal red stripe in area 7. Costa edged with yellowish white. Six, usually white submarginal spots of varying sizes are present, separated by the veins proximally. Dark scales are often present in the basal area below the cell.

♀ : The upperside of the forewing is black, with greyish white streaks. A sharply defined discocellular white bar is present, which on the lower vein, forms a rounded spot. Seven submarginal white spots are present. The hind wing is cream-coloured or yellowish white with a broad black marginal border which enters the light-coloured area between the veins.

The underside of the forewing is as in the male, but darker. The underside of the hind wing is paler than in the male, the veins being streaked with white. The marginal black border is wider than in the male, with longer inward prolongations between the veins. A black streak is present along the lower margin of the cell. The submarginal spots are larger than in the male and usually more distinctly separated from one another. The underside of the hind wing is yellow, with a long red patch above the cell in area 7 and a black border bearing the large yellow submarginal spots.

Expanse : ♂ : 65 - 88 mm. : ♀ : 80 - 90 mm.

Range : Nepal to Burma, at altitudes of 2000 to 5000 feet.

Habits : The subspecies leucacantha is much the commonest form of the present species. This butterfly keeps to the warm, low valleys of the Himalayas, below 5000 feet. It is commonly found between March and December. Its flight is weak, and it may be seen frequently settling on flowers.

Genus **Cepora** Billberg.

This genus includes the butterflies popularly known as the Gulls formerly known by the synonymous name *Huphina* Moore, 1881.

Forewing : The costa is arched. The apex is blunt, the outer margin straight and the tornus rounded.

Hind wing: This is sort and broad with the costa arched and the apex broadly rounded. The outer and inner margins are slightly convex. The tornus is broadly curved and obtuse. The cell is elongate with the discocellular veins disposed obliquely.

Two species are represented in the Museum collection.

Cepora nerissa phryne (Fabricius).

The Common Gull.

Plate VII, fig. 3.

Specimens in the collection : Eleven, Madras; 46.5 mm.

Description : This species is better known by its former synonymous name, ***Huphina** nerissa evagetia* (Cramer).

On the upperside, the forewing bears an apical black area with prominent white spots. The hind wing has the marginal black border dentated on the inner edge.

♂ : On the underside, the costa and apex are tinged with yellow on the forewing. The underside of the hind wing is entirely suffused with yellow and bears a prominent submarginal dusky black band interrupted in area 5.

♀ : The black markings on the wings are much broader and more extensive reducing the white patches of ground colour considerably. The forewing usually bears yellow subapical spots. The cell is heavily bordered with blackish brown, leaving only a white median streak. The veins are all darkened and bordered with black; (in the single female speimen in the collection, these black markings have faded into brown). The hind wing bears prominent submarginal white spots within the rather broad, blackish brown marginal border. The underside is as in the male.

The above description applies to the wet season form which is the nominotypical form, to which all the specimens in the collection, except one, belong.

The dry season form, termed *zeuxippe* is characterized by the black markings being very restricted on the upperside of the wings in both the male and the female, especially on the hind wing. In the male, the hind wing border is reduced to a few vein spots as in the present specimen, in which they are rather feebly marked. In some specimens, they may be absent altogether.

Expanse : 48-65 mm.

Range : Ceylon and Pennisular India up to the North West Provinces and Nepal.

Habits : This is a variable species, common in and around Madras. This is common butterfly found throughout the plains of India, ascending up to 4000 feet in the Himalayas and to 8000 feet in the Nilgiris and other hills of South India. The larvae of these butterflies feed on species of *Capparis* - which are commonly found in all sorts of country. These butterflies are found all the year round and breed wherever the food plants abound. Their flight is strong and more or less in a straight line. They frequent open spaces and are often found settling on flowers or resting on the ground. This species is common in the plains and is frequently found in Madras around garden hedges.

Cepora nadina remba (Moore)

The Lesser Gull.

Plate VII, figs. 4 & 5

Specimens in the collection : Two, South India. Both of them belong to the wet season form which is the nominotypical form of this species; 53 mm.

Description : Wet season : ♂ The upperside of the forewing dusky white with the apical half intensely black. The base bears a bluish tinge. Hind wing with the distal area suffused with bluish grey and the outer margin with a narrow black border which decreases in width behind.

♀ : The upperside is brownish black, with white central areas. The forewing with base of cell and upper basal half of area 1 white, densely dusted with black. The apical half of the cell and base of area 3 and the basal two thirds of area 2 are white, including a submarginal large round spot in area 1. The hind wing bears a triangular central white area.

♂ ♀ : The underside is a rich yellowish green with darker areas and a large, prominent, bright yellow subapical spot below which is large, black, irregular patch. The hind wing is greenish yellow, with the veins black, and a bright greenish yellow irregular spot in the middle of area 6. In the female, the distal dusky patch on the forewing is larger and more prominent.

The dry season form, which is termed *liquida* (Swinhoe), in which the black markings above are more restricted in the male, and the underside of the hind wing is pale yellowish brown in the both the sexes, is not represented in the collection.

Expanse : 55 - 65 mm.

Range : Peninsular India, Western Ghats. The Ceylon form is *Cepora nadina cingala* (Moore).

Habits : This butterfly frequents hilly regions where there is abundant rainfall. It keeps to the thick forest undergrowth and comes out only occasionally on short, irregular

flights. The females are, as a rule, much scarcer. In South India, this species is confined to the middle regions of the Western Ghats and is common towards the end of the rainy season. The larvae feed on species of *Capparis*. The eggs are laid on the leaves or other parts of these plants. They are active butterflies found mostly in thick evergreen forests and seldom rising much above the ground.

Genus **Prioneris** Wallace.

This genus comprises the butterflies commonly known as the Sawtooths. It includes three species from India, of which only one is represented in Ceylon and South India. They mimic species of *Delias*, but possess much stronger powers of flight. The costa of the forewings are widely arched, strongly serrate in the male. The upperside of the wings in the male is white with blackened veins and dark margins.

The hind wing is more or less pyriform, with the costa nearly straight from the base almost up to the apex, and then strongly arched. The wings of the female are of the rounded type, more or less as in *Delias* while those of the male are pointed.

Butterflies of this genus are inhabitants of the jungle. The males have been observed to visit flowers more frequently than the females.

Prioneris sita (C. & R. Felder)

The Painted Sawtooth.

Plate VII, figs. 6 & 7

Specimens in the collection : Two, one of these is from Wynaad and the other from Malabar; 83 mm. The specimen from Wynaad is a dry season form while that from Malabar is a wet season form. The species superficially resembles *Delias eucharis*, the common Jezebel.

Description : Dry season form : ♂ : The upperside is white, with a slight greenish tinge in fresh specimens, but this is faded in the present presened specimen. The veins are narrowly bordered with black in the forewing, and in the hind wing, they are still more narrowly margined with black, and this is only over the distal portion of the wing. The outer margin of the forewing is marked by a narrow black border formed by the triangularly widening terminations of the vein bands. A thin, marginal black band is also present on the hind wing.

The underside of the forewing is white, with the apex tinged with yellow and all the veins broadly margined with black, but these vein bands do not expand at the margins as on the upperside. An ill-defined, somewhat broad, greyish black transverse postdiscal band is present, extending from veins 1 to 7. The underside of the hind wing is rich yellow up to the broad, marginal area which is occupied by a series of large, marginal bright red oblong or truncated cone-shaped spots. The veins are bordered narrowly, but at the same time boldly with black. The head and thorax bear long, closely set bluish grey hairs. The abdomen is white.

PLATE VII

PLATE VII

Fig. 1. *Delias descombesi leucacantha* Fruhstorfer (dorsal view, x $^{3}/_{4}$).

" 2. *Delias descombesi leucacantha* Fruhstorfer (ventral view, x $^{3}/_{4}$).

" 3. *Cepora nerissa phryne* (Fabricius) (natural size).

" 4. *Cepora nadina remba* (Moore) (dorsal view, natural size).

" 5. *Cepora nadina remba* (Moore) (ventral view, natural size).

" 6. *Prioneris sita* (C & R. Felder) (dorsal view, x $^{3}/_{4}$).

" 7. *Prioneris sita* (C & R. Felder) (ventral view, x $^{3}/_{4}$).

" 8. *Anapheis aurota aurota* (Fabricius) (natural size).

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♀: This is similar to the male, but the black edgings to the veins of both wings on both the sides are broader. On the upperside, both the wings bear a diffuse, greyish black postdiscal band. On the underside of the forewing, the cell is traversed by three slender longitudinal black lines. The yellow and red markings on the underside of the hind wing are brighter than in the male.

Wet season, form: The specimen from Madras, which is slightly larger than the preceding one, is a wet season form, distinguished from the dry season form by the veins being more heavily blackened and in the markings on the underside being more darkened especially in the male. In the female, the upperside of the forewing bears three slender greyish black lines in the cell and the apex of the forewing is more rounded than in the male.

Expanse: 80 - 90 mm.

Range: Ceylon and Peninsular India, especially the Western Ghats. Not common, the females being particularly rare.

Habits: This species inhabits large evergreen forests in the Western Ghats, and is found almost throughout the year. In Ceylon also it is found throughout the year, but specially during the South West monsoon. The males of this species generally frequent the tops of tall trees and in the hot days preceding the monsoon, they may be seen in damp places such as river beds and wet patches of sand. This species bears an extremely close resemblance to the Common Jezebel, *Delias eucharis* (Drury), but the flight of *Prioneris sita* is much stronger and swifter than that of *Delias eucharis*. The latter is much commoner.

Genus **Anapheis** Hübner.

The species formerly referred to the genus *Belenois* are now included in the genus *Anapheis*. The costa in the forewing is very slightly arched, nearly straight. The apex is slightly produced. The outer margin is slightly convex and the inner margin slightly sinuous. The tornus is obtuse. The hind wing is pear-shaped, with the cell slightly longer than half the length of the wing. The antenna is fairly long, being about half the length of the wing, with the club at the end rather broad and flattened.

Out of the eight known species, only one, *A. aurota* occurs in India, and of the two races of this species, one, namely *A. aurota taprobana* (Moore) is confined to Ceylon, while the other, *A. aurota aurota* (Fabricius), better known by its more familiar name, *Belenois mesentina mesentina* (Cramer) is recorded from all over India, and is the form which is represented in the Museum collection.

Anapheis aurota aurota (Fabricius).

The Pioneer.

Plate VII, fig. 8.

Specimens in the collection: Seven, of which six are from Madras and one from Godavari; 56.5 mm. (slightly larger than the existing record).

Description: ♂ : The upperside of both the fore and hind wing is white. Forewing with a broad black apical area narrowing to a point towards vein 2. This area is marked with six streak - like transverse spots of the white ground colour. Of these the anterior four are transversely elongate. A prominent black, curved discocellular bar is present at the apex of the cell. The hind wing bears a marginal black border from veins 2 to 6, with a series of four rounded white spots in areas 2 to 5.

The underside of the forewing is similar to the upperside, but the markings are more clearly defined and the apical white spots are larger. The underside of the hind wing varies from orange yellow to a rich chrome yellow, with the veins broadly bordered with black. The marginal black border and white spots are as on the upperside.

♀: This resembles the male, but the black markings are broader, and the white apical spots of the forewing are often partly obscured on the upperside.

In both the sexes, the head and abdomen are white and the thorax often bluish grey above.

Of the seven specimens in the collection four belong to the wet season form described above.

Dry season form: The dry season form is designated *bordaca* (Walker). This is similar to the wet season form, but on the upperside, the black markings, especially the curved discocellular bar, are narrower and the white spots on the apical black area of the forewing are broader and longer and on the hind wing the white submarginal spots are larger and are almost continuous with the white ground colour on the inner side. Further, the underside of the hind wing is of a much paler yellow colour than in the wet season form. Three of the seven specimens in the collection belong to the dry season form.

Expanse: 40 - 55 mm.

Range : Throughout India, except Assam, The range of this subspecies also extends to Palestine and Africa.

Habits: This is a common butterfly of open country, inhabiting especially dry regions, but ascends to an altitude of 8000 feet. Its flight is strong, but slow. It is fond of sunshine, and both sexes frequent flowers. The appearance of this form is seasonal. It migrates in swarms when it appears.

PLATE VIII

PLATE VIII

Fig. 1. *Appias lalage lalage* (Doubleday) (natural size).

" 2. *Appias indra shiva* (Swinhoe) (natural size).

" 3. *Appias libythea libythea* (Fabricius) (natural size).

" 4. *Appias lyncida taprobana* Moore (natural size).

" 5. *Appias lyncida latifasciata* Moore (dorsal view, natural size).

" 6. *Appias lyncida latifasciata* Moore (Ventral view, natural size).

" 7. *Appias lyncida eleonora* Boisduval (natural size).

" 8. *Appias albina darada* (C.R. Felder) (natural size).

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Genus **Appias** Hübner

This genus comprises butterflies commonly known as the Puffins an Albatrosses.

♂ ♀ : The costa in the forewing is widely arched. The apex is rather sharply pointed or slightly rounded, being always more rounded in the female than in the male. The outer margin is straight, with the tornus well defined. The inner margin is straight or slightly sinuous. The cell is always a little longer than half the length of the wing. These butterflies are generally white, with black marginal and apical markings on the forewings and sometimes with a cell spot. The females always have additional black markings. The hind wing is more or less broadly pear - shaped, with the pre - costal vein long and strongly arched. These are fast fliers and the males are often found in large numbers in company with other species settling on the flowers particularly in damp places.

Six species of this genus are represented in the collection and one of these species, *Appias lyncida* is represented by two races in the collection. The keys given in the Fauna of British India volume on Butterflies (Vol.I, second edition) by Talbot are helpful in distinguishing these species as well as others represented in other parts of India. Many of the species of *Appias* are found all over Peninsular India and Ceylon.

Appias lalage lalage (Doubleday).

The Spot Puffin.

Plate VIII, fig . 1.

Specimens in the collection: One, Netterikkal Region of the Kalakkad Forest, Tinnevelly District, South India. This appears to be the first record of this species from Southern India as Talbot mentions its range as United Provinces, Mussooree to Burma and Wynter Blyth states it as Simla to Burma and Assam. Antram also cites this as a rare species from the Himalayas, Sikkim, Bhutan and Assam. The single specimen in the collection is a male of the wet season form.

Description: Wet season form : ♂ : The upperside is white; the forewing with the basal area densely suffused with black. The basal half of the costa is tinged with dusky yellow. A large black spot is present on the lower discocellular vein. This spot touches another larger black spot in area 3 and this spot merges with the marginal black, enclosing a somewhat triangular white submarginal spot in area 3. Three very faintly marked whitish brown subapical spots are present on the apical black area. The hind wing is white, with an irregular, somewhat marbled outer black border which becomes ill defined and diffuse towards the inside and on the tornus.

The underside of the forewing is white, with a black discocellular spot as on the upperside. The base of the costa is yellowish green. A thick, post-discal curved black band is present. The apical area is greenish yellow. The underside of the hind wing is uniformly dull yellowish, the vein being of a brighter yellow colour. Faint, wavy discal lines may be present.

♀ : The black markings are more extensive than in the male. In the forewing, the apical black area reaches into the cell and is extended as a stripe to the base of the cell and the marginal black area is very broad. The hind wing is white over two - thirds of the area basally and tinged with yellow. The outer third of the area is dusky black. The underside of the forewing with black and white areas much as on the upperside, but with the extreme base and lower half of cell yellowish green and the remaining half of the cell black. The underside of the hind wing varies in colour from an ochraceous yellow to purplish white with the darker markings more distinct. Spots and bands are as in the male.

The head and thorax are tufted with greenish yellow hairs in both the sexes. The undersides of the head, thorax and abdomen are yellowish white.

In the dry season form, (designated *argyridina* Butler), the black markings are more restricted. The male often has no terminal spots or border on the upperside of the hind wing.

Expanse: 55 - 80 mm.

Range: Himalayas, Sikkim, Bhutan, Assam, United Provinces, Mussooree to Burma. It is rare in South India, the only record being the present specimen collected from Kalakkad Forest in the Tinevelly District.

Habits: The habits of this species are generally those characteristic of the genus, mentioned above. This is an inhabitant of the hills ascending up to an altitude of about 6, 500 feet. Not much has been recorded specifically about its habits.

Appias indra shiva (Swinhoe)

The Plain Puffin.

Plate VIII, fig. 2.

Specimens in the collection: Six, Wynaad and Coorg; 52.5 mm. This is less than the minimum recorded expanse for this species.

Description: ♂ : The upperside of the forewing is white with a broad, black apical area, generally with two white spots. The black area is produced inwards in area 3. There is no isolated black spot in area 3 as in the preceding species. The upperside of the hind wing is white, without a black marginal border. The apex of the forewing is somewhat pointed.

The underside of the forewing is without a discocellular black spot, and no spot in area 3. The apical area is ochraceous bordered with brownish black. In the hind wing, the ground colour is variable, usually pale greyish brown, and there are more or less distinct transverse bars which may be interrupted. A minute black discocellular spot is present and similar marginal spots may also be present.

♀ : The black markings are more extensive, especially on the hind wing on which there is a narrow black marginal border which is absent in the male.

Specimens with particularly broad black apical area are separated into the form *statilia* Fruhstorfer, but all the specimens in the present collection belong to the nominotypical form.

In the dry season form, the black markings are reduced.

Expanse: 60 - 70 mm.

Range: Peninsular India and Ceylon. But it is rare in South India and Ceylon, while it is commoner in North India. It is said to be abundant in Coorg at certain seasons. Four of the specimens represented in the collection are from Coorg.

Habits: In the Himalayas, it is found up to an altitude of about 6000 feet. In South India and Ceylon it is rare. In South India, its distribution ranges from Coorg to Travancore. It flies high, at a height of about 2000 feet and is found both in forest and open country on the hills of the Western Ghats. The female keeps to the dense jungles, but the males often come out to the open country and frequent damp places. The Ceylon race is termed *narendra*, and is darker.

Appias libythea libythea (Fabricius).

The striped Albatross.

Plate VIII, fig. 3.

Specimens in the collection: Two both females, but their exact locality is not recorded. Both belong to the wet season form; 55 mm.

Description: ♂ : The upperside is white, with the apex, costa and outer margin of the forewing very narrowly marked with dusky black, this colour extending narowly along the veins for some distance. The underside is pure white, with the costa and the apex narrowly bordered with black.

♀ : The upperside is white, with the forewing black over the costa, apical area and outer margin. The cell is also largely black. The black cell is continuous with the outer marginal black along vein 4, leaving a short, oblong, oblique bar of the white ground colour beyond the cell. The marginal black area narrows posteriorly and its inner edge is somewhat irregular. The hind wing has the outer margin broadly bordered with black. A subcostal diffuse dusky black streak and another discal streak are present, separated by a series of ill defined islets of the white ground colour. The underside is white with the marginal black on the forewing interrupted by a series of white streaks between the veins. In the hind wing, the marginal black border is very faintly marked. The dark markings are on the whole more diffuse than on the upperside.

The dry season form, *ares* Swinhoe, is distinguished by the black markings being reduced and more restricted and the underside of the wings bears a more ochraceous ground colour, the markings being more brownish.

Expanse: 50 - 60 mm.

Range: This is essentially a butterfly of the plains and open country and is perhaps the only species of *Appias* that is to be found away from thick jungle. Occasionally it is found in forest clearings. Normally it is met with at low elevations, but as it is a local migrant, specimens are sometimes caught at an altitude of even 6500 feet. Their flight is strong and the males often visit flowers and frequent moist places. The female is much rarer than the male, but this is due to the fact that the female is more retiring in her habits.

Appias lyncida (Cramer).

The Chocolate Albatross.

Specimens in the collection: Four; one of these belongs to the race *taprobana* Moore, two to the race *latifasciata* Moore and one to the dry season form *vacans* of the race *eleonora* (Boisduval); 60 mm.

Description : ♂ : Both the wings bear an outer marginal black border, the inner edge of which is more or less dentated. The forewing is narrowed at the apex. The costa is broadly bluish on the forewing. On the hind wing, the black marginal dentated border is inwardly bordered with bluish grey.

The underside of the forewing bears a brownish black costal and outer marginal border, widened over the apical area which is marked with a yellow subapical spot. The underside of the hind wing is bright yellow with a broad, chocolate brown marginal border.

♀: The upperside of the forewing is dusky black with conspicuous white transverse bands. The upperside of the hind wing is also dusky black, except discal area which is white. The underside of the forewing is whitish and that of the hind wing white or yellowish with broad dusky, terminal area.

This species is divided into various geographical races, ranging over Ceylon, Peninsular India to Sikkim, Burma and the Nicobar Islands. The Ceylon race is *taprobana* Moore. The race *latifasciata* Moore, occurs in Peninsular India and *eleonora* (Boisduval), formerly known as *hippoides* Moore, extends from Sikkim to Burma, over the Himalayas. All these three races are represented in the collection.

Appias lyncida taprobana Moore.

Plate VIII, fig. 4.

Specimens in the collection : One, Ceylon, ♀ 60 mm.

Description : Wet season form : The upperside of the wings bears very broad black marginal borders which are strongly dentate on their inner edges. The underside of the hind wing is deep ochraceous.

♀ (the sex which is represented in the collection) : The upperside of the forewing is dusky black with the white transverse stripes well developed. The cell stripe is conspicuous. The upperside of the hind wing is largely dusky black, except the discal area which is white. The dusky black colour of the wings has faded into brown in the present specimen.

In the dry season form, (designated *aperta*); the black markings are reduced in the male, and the underside of the hind wing is pale yellow. In the female, the hind wing has a sharpy defined black marginal border.

Expanse : 55 - 70 mm.

Range : Ceylon

Habits : This butterfly generally keeps to wooded country in wet and hilly regions and is frequently found flying below 3000 feet. Its flight is strong and swift. It is often found in jungle clearings and around forest streams. The males frequently hover around small shrubs and bushes and settle in large numbers on moist patches of sand.

Appias lyncida latifasciata Moore.

Plate VIII, figs. 5 & 6.

Specimens in the collection : Two, South India ; 64 mm.

Description : This race is only distinguished by slight differences from the preceding race from Ceylon. Both the specimens in the collection belong to the wet season form, which is the nominotypical form of this race.

The upperside of the forewing is white, with the dark marginal borders narrow, and dentate on the inner edge. The upperside of the hind wing has similar dusky black marginal border dentated on the inner edge and bordered inwardly with bluish grey. The dark marginal border is very broad on the underside of the hind wing, reaching to the end of the cell. Veins 6 to 8 are conspicuously blackened and the basal half of area 6 is marked by a black stripe.

This is very similar to that of the preceding race. The white areas on the forewing are more extensive and coalescing.

In the dry season form, the black areas are more restricted and the underside of the hind wing is paler and the veins 6 to 9 are not blackened.

Expanse : 55 - 70 mm.

Range : Peninsular India, ascending up the hills to an altitude of 4000 feet. In South India, where this race is found along the foot of the hills in the Western Ghats, and in the Nilgiris, this butterfly is fairly common and may be seen at all seasons of the year.

Habits : Similar to those of the Ceylon race.

Appias lyncida eleonora (Boisduval).

Plate VIII, fig. 7.

Specimens in the collection : One male specimen belonging to the dry season form (*vacans* Butler) but its exact locality is not recorded. This race was formerly referred to as *hippoides* Moore : 60 mm.

Description: ♂ : The upperside of the forewing is white, the costal border of the forewing and the dark border of the hind wing are flushed with a bluish tinge. The marginal black border is dentate on its inner edge on the forewing, but on the hind wing the inner edge of the marginal border is only feebly dentate.

The under side of the forewing is white with the costal area more or less densely dusted with black, and spread out into a broad, black apical area. The underside of the hind wing is sulphur yellow, the dark marginal border being much wider than on the upper surface.

♀ : The upperside is dusky blackish brown, with transverse white streaks on the forewing. In the hind wing, the basal area is white, merging into the dark distal area.

On the underside of the forewing, the white streaks are broader and more extensive. The hind wing is pale sulphur yellow over the basal two thirds of the area. The apical area is dusky brownish black.

The head, thorax and abdomen are white, with a bluish tinge.

The dry season form *vacans* to which the present specimen belongs is distinguished by the marginal black border being narrower. The female resembles the male of the wet season form. There is considerable seasonal variation in this race and intermediate forms between the wet and dry season forms occur.

Expanse: 55 - 70 mm.

Range: Sikkim to Assam and Burma, and extending even to Siam and Annam.

Habits: Similar to those the Ceylon and South Indian races.

Appias albina darada (C. & R. Felder)

The Common Albatross.

Plate VIII, fig. 8.

Specimens in the collection: Seventeen, mostly from the Nilgiris and from the Nagalapuram Hill, Chingleput District by Mr. Barnes. Of these, about eight specimens belong to the dry season form and the rest to the wet season form. This species is subject to considerable seasonal variation; 54.5 mm. (about 6 mm. smaller than the minimum recorded expanse).

Description : Wet season form: ♂ : The upperside is white with the apex of the forewing acute. The outer margin is straight. The upperside of the forewing bears narrow, black, apical and terminal markings. The basal dark area has a diffused and incurved edge. The upperside of the hind wing sometimes bears small black spots at the ends of the veins. The underside of the hind wing is without any markings, but on the underside of the forewing there is a clouded oblique discocellular black band which projects inwards about its middle.

♀ : The upperside is white. The apex, costa and termen of the forewing are black with four to five apical white spots, the terminal border being indented in area 2. There is a light greyish black scaling over the basal area. The upperside of the hind wing bears a narrow, black marginal border dentate on its inner edge. The seasonal variations are more marked in the male.

Dry season form : ♂: On the upperside of the forewing the black apical and terminal markings are absent, so that the entire forewing is almost uniformly white above, except for a greyish black scaling over the costa. The hind wing is unmarked. The apical area on the underside of the forewing, and the whole of the underside of the hind wing are dull pale ochraceous.

There is one specimen in the collection from Nagalapuram, Chengalput District, which is white above, with scattered light brown patches. This appears to be an aberrant dry season form of the same species.

Expanse: 60 - 75 mm.

Range: Ceylon and Peninsular India up to Sikkim, and extending to Burma and Andaman Islands. In South India, the range of this species extends up to the Western Ghats to North Canara and is found scattered in Various localities throughout the Peninsula. In the Nilgiris, it is one of the most abundant species. It is also common in Ceylon, Coorg and Bangalore.

Habits: The flight of this butterfly is fast and powerful. The males sometimes congregate in large numbers in damp places. They rest underneath leaves during the hot part of the day.

Appias wardi (Moore).

The Lesser Albatross.

Plate IX. fig. 1.

Specimens in the collection: One, South Coorg. It is a male and belongs to the wet season form; 63 mm.

Description: ♂: The upperside is white, with the pattern of colouration somewhat resembling that of a female of *Appias albina*. The base of the forewing is broadly dusted with black (which in the present specimen has faded into bluish grey). The apical and marginal areas are black enclosing four subapical white spots and a transversely elongate anterior white spot. The upperside of the hind wing bears a slight black dusting over the basal areas and there is a narrow marginal black border, the black being emphasised and prolonged inwards for a short distance along the veins.

The underside of the forewing is white, with the apical area butter yellow and bearing a narrow, post-discal zig-zag irregularly curved black band. The underside of the hind wing is butter yellow.

♀ : This is more or less similar to the male, but the forewing bears only two apical spots and the black areas are much more extensive. The black dusting over the basal area is more dense. The basal half of the cell is sulphur yellow. The post-discal black band is much broader. The underside of the hind wing is pearly bluish white.

In the dry season form *(arida)* the black areas are more restricted. The apical area is more diffuse, with the subapical spots very ill defined. The hind wing has a yellow tinge in the female.

Expanse: 55 - 75 mm.

Range: Peninsular India, Kanara, Nilgiris, Coorg, Trivancore.

Habits: This is a rare species, but is sometimes fairly common on the Ghats, and mainly confined to wooded country below 2500 feet. The males are at times abundant, gathering in large numbers in damp places. The habits are very similar to those of *Appias lyncida* (Cramer).

Genus **Pieris** Schrank.

Description : ♂ ♀: This genus includes white butterflies of moderate size, with black apical markings. The forewing bears an obtuse apex and an arched costa. The tornus is broadly rounded. The hind wing is broadly subtriangular, with an almost evenly rounded margin, the apex, termen and dorsum being arched and forming a continuous curve. The antennae are about half the length of the forewing, with a small and gradually enlarged club. Some species bear a black spot at the end of the cell in the forewing.

Most of the species of this genus are confined to the Himalayas and the hills of North east India. Only a single species occurs in South India. This and five other species are represented in the collection.

Pieris canida canis Evans.

The Indian Cabbage White.

Plate IX, fig 2.

Specimens in the collection: Six, four of which are from the Pulney Hills;48 mm

Description: ♂ ♀ : The upperside of the forewing is white, with a black apical area and a black outer margin which is dentate inwardly. The discal area bears a prominent squarish black spot in area 3 and a similar black spot in area 1 b. The hind wing bears an apical spot adjacent to the costa and a series of marginal triangulr black spots pointed inwardly.

The underside of the forewing is white, without marginal and apical black areas, but the two large, squarish black spots in interspace 3 and 1 b are prominent. The underside of the hind wing is uniform, dusted with grey.

In the female, there is an additional discal spot on the upperside of the forewing.

In the southern race *canis* Evans, to which the present specimens belong, the black areas are wider and the underside of the hind wing is dusted with black leaving stripes of the yellowish white ground colour, extending half way from the margin, and one long stripe along the middle from the base, through the cell to the margin.

This is more heavily marked than the typical form *indica*. The marginal black spots on the hind wing are much larger and in the forewing, the cell and basal area are more heavily dusted with black scaling.

Expanse: 45 - 60 mm.

Range : Peshawar, Himalayas, Assam and Burma. Hills of Southern India; Nilgiris, Palnis and Hills of Travancore and cochin.

Habits: This species is common in the Nilgiris above an altitude of 5000 feet. Its flight is weak and it generally keeps close to the ground. It is often seen flying in the open places and frequently settles on flowers. In Southern India it is found only on the hills of Travancore and the Nilgiris, but a solitary specimen has been collected from Bangalore.

Pieris callidice kalora Moore.

The Lofty Bath White.

Plate IX, fig. 3.

Specimens in the collection: One, male; its exact locality is not recorded; 40 mm. (10 mm. smaller than the minimum recorded expanse).

Description : ♂ : The upperside is white, with the basal area black. A more or less narrow, rectangular, transverse black spot is present at the end of the cell. This is followed by a post-discal curved series of spots inwardly prolonged. A similar series of black, marginal triangular spots, produced and pointed inwardly are present. The upperside of the hind wing is unmarked, but the basal area is dusted with black.

The underside of the forewing is white with black area at the base of the costal margin and a black discocellular rectangular spot. This is followed by four black spots and a marginal row of elongate green lines reaching up to the outer margin. The underside of the hind wing is green with an oval yellowish white spot in the cell and post-discal and marginal rows of inwardly pointed elongate yellowish white spots.

The antennae are black, spotted with white. The head and thorax are brownish and blackish grey respectively, and abdomen black above. Their undersides are white.

♀ : The upperside of the forewing is similar to that in the male, but with the markings much larger and on the hind wing the basal black dusting is extensive.

On the underside, the apical and marginal green areas are more extensive on the forewing, and on the hind wing the elongagte marginal spots are narrower.

Expanse: 50 - 60 mm.

Range: North west Frontier Province, Chitral, Kumaon and Uttar Pradesh.

Habits: This is a common species inhabiting hilly regions at high elevations. Its habits are more or less the same as those of the preceding species.

Pieris brassicae (Linnaeus).

The Large Cabbage White.

Plate IX, fig. 4.

Specimens in the collection : Two, both males. Their exact locality is not recorded; 60.5 mm. The smaller specimen is 9 mm. smaller than the minimum recorded expanse.

Description : ♂ : The upperside of the forewing is white with the apical area broadly black. There is no discal spot on the forewing. The upperside of the hind wing bears an apical spot.

The underside of the forewing is white, with two large discal black spots and the underside of the hind wing pale yellowish, dusted with black.

This is similar to the male, except that there are two discal spots on the upperside of the forewing. The black margins on the forewing are also more extensively developed.

Expanse : 65 - 75 mm.

PLATE IX

PLATE IX

Fig. 1. *Applas wardil* (Moore) (natural size).

" 2. *Pieris canida canis* Evans (natural size).

" 3. *Pieris callidice kalora* Moore (natural size).

" 4. *Pieris brassicae* (Linnaeus) (natural size).

" 5. *Pieris rapea* (Linnaeus) (natural size).

" 6. *Pieris napi ajaka* Moore (natural size).

" 7. *Pontia daplidice moorei* (Rober) (natural size).

" 8. *Ixias marianne* (Cramer) (natural size).

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Range : This is a widely distributed species, ranging all over Europe, Baluchistan and the Himalayas, up to Assam, and the plains near the foothills of the Himalayas.

Habits : This is a very common species found abundantly in the Himalayas, normally between elevations of about 3000 to 12, 000 feet, but it is also found in the plains near the Himalayas during the winter. Some specimens are migratory. The larvae, which are bluish green with black dots and yellow stripes, feed on cabbages and allied plants of the family Cruciferae.

Pieris rapae (Linnaeus)

The Small Cabbage White.

Plate IX, fig. 5.

Specimens in the collection : Four, (one male and three female); their exact locality is not recorded. The only Indian race is *iranica* Le Cerf, to which the present specimens belong; 46.5 mm.

Description : ♂ : The upperside is white, with a portion of the costa of the forewing and the bases of both the wings feebly dusted with black. A small area at the apex of the forewing is black, the width of the black area being variable. A discal black spot is present in area 3, but this may be asbent; (in one of the present specimens it is absent altogether).

The underside of the forewing is dusted with black over the costal margin and the upper half of the cell. The underside of the hind wing is white basally, and cream-coloured distally.

The antennae, head, thorax and abdomen are black, banded with white above; the underside of the head, thorax and abdomen are white.

♀ : This resembles the male except that there is an additional discal black spot on the upperside of the forewing and on the underside, the entire hind wing is more yellowish than in the male.

Expanse: 45-55 mm.

Range : North Persia to Baluchistan, Chitral, Kashmir and Ladak. Also North West Frontier Province. The range of the species as a whole extends over the entire Palaearctic Region, including North America.

Habits: This is a very widely distributed species. The present race is distinguished from the typical European form by the larger black apical area on the forewing. The Indian race is said to be common above an altitude of 4000 feet in Chitral during summer.

Pieris napi ajaka Moore.

The Green-vined White.

Plate IX, fig. 6.

Specimens in the collection: Two, both females; their locality is not recorded. One of the specimens is incomplete; 46 mm.

Description: ♂ : The upperside is white, with the veins slightly darkened. The apex of the forewing is black; a discal spot is present in interspace 3 (but this may be absent). The underside is yellowish, with the veins marked greenish.

♀ : The upperside is white, the upperside of the forewing bears a black apical area and a large discal spot in area 3. There is an additional spot in area 1 b. All the veins are blackened. The upperside of the hind wing bears a large apical spot.

This species is subject to considerable seasonal variation, the wet season form being darker.

Expanse: 40-55 mm.

Range : Murree to Kumaon.

Habits: This species is confined to wooded country in the hills, especially near streams and rivers and is locally abundant. It is common in the Himalayas at high elevations, just before the rains.

Genus **Pontia** Fabricius.

This genus closely resembles *Pieris* and formerly united with *Pieris*, but the forewing has only nine veins, the veins 7-8 and 9 being fused.

The black apical area on the upperside of the forewing bears prominent white spots. A large, squarish discocellular spot is also present. The underside of the hind wing is greenish with rows of white spots.

Of the three Indian species of this genus, only one, *Pontia daplidice* (Linnaeus) is represented in the collection, by the typical Indian race, *moorei* (Rober).

Pontia daplidice moorei (Rober).

The Bath White.

Plate IX, fig. 7.

Specimens in the collection: Two, both females; their exact locality is not recorded; 46 mm.

Description: ♂ : The upperside is white; the black apical area on the upperside of the forewing bears white spots and lines. The forewing and basal half of the costa are narrowly dusted with black. A large, squarish discocellular spot is present on the upperside of the forewing. The hind wing is uniform, with the markings on the underside showing through. The underside of the forewing is white with the base of the cell dusted with green. A black discocellular spot and another black spot in area 1 b are present. The underside of the hind wing is green, with a rounded white spot in the middle of the cell and a curved irregular post-discal band of connected spots.

The antennae are dusky black, and the head, thorax and abdomen brownish black. The underside of the head, thorax and abdomen are white.

♀ : This is similar to the male, but with a discal spot in area 1 b on the upperside of the forewing, and the hind wing bears a large costal black spot and a series of faint connected marginal black spots.

Expanse : 45-50 mm.

Range : The range of the species as a whole extends over Europe and North Africa and through North West India to China and Siberia, but the Indian subspecies to which the present specimens belong is confined to Baluchistan, Chitral, Kashmir, Punjab and Peshawar.

Habits : This species is common at high altitudes especially in the Kashmir Valley. But it is also found in the plains at Peshawar during April.

Genus **Ixias** Hübner.

This genus includes the butterflies popularly known as the Orange Tips. They are white or yellow butterflies subject to considerable seasonal variation. The male generally bears an orange or yellow apical area on the forewing.

Description: ♂ ♀ : The costa on the forewing is regularly curved and the outer margin is straight. The apex is rounded or obtuse. The tornus is rounded. The cell is relatively broad and about half the length of the wing. The hind wing is short and broad with a broad cell. The club at the end of the antennae is flattened and spatulate.

The males fly fast and assemble in large numbers in wet places. The females are slower in their flight and frequent flowers. Most species are found on the plains and are very common and familiar. In the wet season forms the black markings on the upperside are more prominent.

Both the common Indian species, *Ixias marianne* and *Ixias pyrene* are represented in the collection, the latter by the subspecies *sesia* (Fabricius) (formerly known as *frequens* Butler), which is the only subspecies of this species recorded from South India and all over Peninsular India up to Bengal.

Ixias marianne (Cramer).

The White Orange Tip.

Plate IX, fig. 8.

Specimens in the collection : Four, of which two are from Madras, one is from Bangalore and the fourth from an unrecorded locality. Of these, two are male, and two female. All of them belong to the wet season form which is the nominotypical form of this species; 56 mm. (This is slightly larger than the maximum recorded expanse for the species).

Description :♂: The upperside is chalky white. The apical half of the wing is black enclosing a large, broad apical patch of orange, which extends to the upper angle of the cell. The patch is broadest opposite the apex, but narrows posteriorly. The black is reduced to a narrow band along the apex and the costal margin. The hind wing bears a fairly broad black terminal border, the inner edge of which is somewhat ill defined. The base of the wings is dusted with black scaling.

The underside is a rich sulphur-yellow, stippled with minute dots. The orange patch of the upperside shows through in the forewing. A broad, white triangular area is present below the cell. A prominent black discocellular spot, centred with white is present on the underside of the forewing. Both wings bear a transverse discal series of reddish brown spots centred with white, on the underside. The forewing (underside) bears a prominent black patch above the tornus. The antennae are reddish brown and the head and thorax are also covered with reddish brown hairs anteriorly.

♀: This resembles the male but the orange patch on the forewing is narrower, truncate behind, and bears a series of four black spots. The underside is as in the male, but markings are slightly larger.

The dry season form (*agniuena* Moore) is smaller, with the orange patch on the forewing larger and paler and the black border on the hind wing narrower. The markings on the underside are more prominent than in the wet form but the wet season form is more heavily marked on the upperside.

Expanse: 50-55 mm.

Range: Ceylon, Peninsular India, Punjab, Saurashtra, Bengal, Kumaon. It is common throughtout its range.

Habits : This butterfly always flies rapidly very low above the ground. The males often settle on flowers and bushes and occasionally gather on damp patches of sand. The females are more retiring and are found flying low among the hedges and undergrowth. This species is an inhabitant of the open plains and scrubland, and does not usually ascend hills. The eggs are laid singly on thorns, stems or leaves. Its flight is stronger and faster than that of the next species, *Ixias pyrene*. The larvae feed on species of *Capparis*.

Ixias pyrene (Linnaeus).

This species is the most widely distributed species of the genus and is also the most variable. A number of races are known.

Description : ♂ : The upperside is yellow, with the costal border and the apical area and the outer margin broadly black. A large orange band is present. The hind wing bears a black outer border which may be reduced or absent in dry season forms.

The underside is of a paler yellow colour, speckled with brown and both wings bear a discocellular spot and a submarginal row of blackish brown spots. The underside of the forewing usually bears a black tornal spot.

♀: The upperside is either yellow or white. In the white forms, the band on the forewing is also white instead of orange. The band on the forewing is usually interrupted at vein 4. The outer black area is sometimes extended over the whole wing. The outer black border on the hind wing is broader than in the male.

Only one subspecies is recorded from Peninsular India, and this is the only one represented in the collection.

Range : Japan, Formosa to China, India, Andaman Islands, Ceylon and Malay Peninsula.

Ixias pyrene sesia (Fruhstorfer)

This is a synonym for *Ixias pyrene frequens* Butler, by which name this subspecies was known formerly. But the name *frequens* is now restricted to the wet season form of *sesia*.

Specimens in the collection : Nine, Nilgiris, Bangalore and Madras; 52.5 mm.

Description: ♂ : This is very similar to the typical form described above. The orange band on the forewing is fairly broad, and the black area is also broad reaching up to the base of area 3. The outer black border on the hind wing is also fairly broad.

♀ : This is yellow, with the band on the forewing also yellow, sometimes tinged with orange. The black areas are on the whole more extensive than in the male. The apical band is smaller in area and bears two black spots.

The underside in both the sexes is as in the typical form described above.

Expanse : 50-70 mm.

Range : Peninsular India to Bengal.

Habits : This is slightly slower in its flight than *Ixias marianne*, but it flies straight and rather hurriedly much in the same way as that species. It is a sun-loving species frequenting flowers and often resting on leaves. It is mostly found in scrub jungle at the

bases of hills and is particularly fond of places abounding in thorny bushes such as prickly pear and tangled vegetation, and this makes it difficult to catch them. It is common all over most of the low hill ranges of Southern India.

Genus **Colotis** Hübner.

This genus includes the butterflies commonly known as the Arabs and Small Orange Tips. These are small, white or salmon-coloured butterflies with black markings and sometimes bearing an orange area over the apex of the forewing. The costa on the forewing is slightly arched and the apex obtusely rounded; the tornus is obtuse, but well defined. The cell is about half the length of the wing. On the hind wing the costa is arched, the apex rounded and the outer margin is slightly arched. The cell is less than half the length of the wing. The antennae are short, with an abruptly enlarged, spatulate club.

The species of *Colotis* are among the most variable of the members of the family Pieridae, and many of them exhibit remarkable seasonal variation and sexual dimorphism. They are mostly inhabitants of dry and semi-desert regions of the plains, being seldom found in forests or high hills. These butterflies flutter about close to the ground, the males frequently settling on flowers: they love sunshine.

Of the seven species of *Colotis* found in India, three are represented in the Museum collection, although five of the seven species are common and distributed throughout India, and only two species are confined to the dry regions of the north.

Colotis calais (Cramer).

The ground colour of the upperside is salmon pink in both the sexes. A black costal border is present on the forewing, touching a conspicuous triangular discocellular spot. A pale submarginal spot is present in area 1 b. The hind wing bears a broad, black outer border, bearing distinct rounded islets of the ground colour.

This species is better known as *amata* under which name it is found described in the earlier publications.

This species has a wide range of distribution ranging from Africa, Arābia and Persia to Northwest India and even Peninsular India and Ceylon.

Colotis calais modestus (Butler).

The Small Salmon Arab.

Plate X. fig. 3.

Speciments in the collection : Six, Nilgiris and Godavari; 38 mm.

Description : ♂ : The colouration and markings are much the same as in the typical form of the species described above, but the tornal spot on the upperside of the

PLATE X

PLATE X

Fig. 1. *Ixias pyrene sesta* (Fabricius) (dorsal view, natural size).

" 2. *Ixias pyrene sesta* (Fabricius) (ventral view, natural size).

" 3. *Colotis calais modesta* (Butler) (natural size).

" 4. *Colotis fausta fulvia* (Wallace) (natural size).

" 5. *Colotis eucharis* (Fabricius) (natural size).

" 6. *Colotis danae danae* (Fabricius) (natural size).

" 7. *Hebomoia glaucippe australis* Butler (x $^3/_4$).

" 8. *Valeria ceylanica ceylanica* (Felder) (x $^3/_4$).

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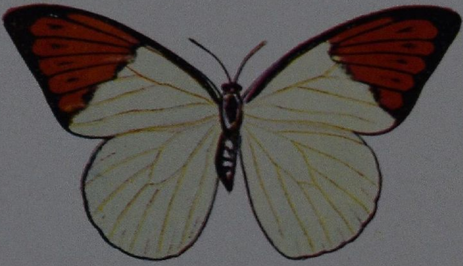

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forewing is smaller and not squarish. The pale marginal spots are also smaller. The upperside of the hind wing bears a black band of specialized scales on the costal margin.

♀: This occurs in two forms: one resembles the male, and in the other, form *albina*, the ground colour of the upperside is white.

The underside in both the sexes is uniformly dull yellowish without any markings or spots, but some of the spots on the upperside show through. A pale, whitish area extends as a broad band along the inner margin of the forewing.

Expanse: 35-55 mm.

Range : Ceylon and Peninsular India, upto Burma, (except the North eastern part of India).

Habits : These butterflies have a weak, fluttering kind of flight, but it is fairly straight and direct. They always keep close to the ground and seldom settle on flowers. They are sun-loving insects and prefer to bask in the sun, resting on leaves with their wings partially open. At night, they rest with their wings closed over their backs on the underside of leaves. Their food plants (belonging to the family Salvadoraceae) are found in dry, desert-like regions.

Colotis fausta (Olivier).

The Large Salmon Arab.

Description : ♂ : The upperside is pale to deep salmon-buff colour. The forewing bears a conspicuous black discocellular spot which is distinctly separated from the costal border. A broad, black, apical area is present, narrowing to a point behind and enclosing spots of the ground colour. A series of small marginal spots are also present. The hind wing is uniformly salmon-buff with or without a series of marginal black spots.

The underside of the forewing bears an oval patch of modified scales (sex brand). This shows through on the upperside as a small raised spot.

♀ : This occurs in two forms. One resembles the male, but without the sex brand mentioned above. The second form is white, or partly white and partly salmon-buff.

Three races of this species occur, of which the Peninsular Indian and Ceylon race is *fulvia* and of this race, a single specimen is represented in the collection.

Colotis fausta fulvia (Wallace).

The Large Salmon Arab.

Plate X, fig. 4.

Specimens in the collection : One, Nilgiris: 50 mm.

Description : This subspecies closely resembles the nominotypical form described above, but is distinguished from it by the marginal black area on the upperside of the forewing being extended up to the tornus.

♂: The ground colour of the upperside is deep salmon buff, almost orange-yellow. The costa on the forewing is heavily dusted with black scaling. The discocellular spot is large. The apical area is black and encloses three fairly large, sub-apical spots of the ground colour (of which the anteriormost is the largest and more or less transversely elongate). A series of minute marginal spots of the ground colour are also present. The hind wing bears a series of fairly large black marginal spots.

The underside is rich yellow with the markings dusky black on the forewing and pinkish on the hind wing.

The single specimen represented in the collection is a male.

♀ : The upperside is white with the basal and costal areas on the forewing dusted with greyish blue. In the hind wing, there is a black marginal border and white marginal spots.

The underside of the forewing is white, sometimes faintly tinged with yellow. The discocellular spot is very large. A broad, post-discal reddish brown band is present. The underside of the hind wing is pale ochraceous yellow lightly dusted with black. A post-discal reddish brown band is present as on the forewing.

Expanse: 45-55 mm.

Range: Northern part of Ceylon and whole of Peninsular India.

Habits: This butterfly flies much faster than members of the other species of this genus. They fly generally near the ground and keep to open, dry regions. They frequent flowers among the grasses. The females are seen more rarely. They are hardly ever found in the forests or at high elevations. Their food plant is a climbing shrub, belonging to the family Capparidaceae, growing in dry, desert-like localities. This is a species of sun-loving butterflies.

Colotis eucharis (Fabricius).

The Plain Orange Tip.

Plate X, fig. 5.

Specimens in the collection: Five, Madras and Mysore; 46 mm.

Description : ♂ : The upperside is pure white. The forewing bears a broad, apical, orange-yellow patch, bordered with bright yellow. The base and costa of the forewing for a short distance are sparsely dusted with black. The orange-yellow apical patch generally bears a diffuse black spot on its lower inner edge. The hind wing bears a series of black marginal vein spots. In one of the specimens from Madras, represented in the collection,

these marginal spots are totally absent, the whole of the hind wing being uniformly pure white throughout.

The underside is usually pure white, tinged with pinkish yellow and suffused with bright yellow at the base of the forewing. A prominent sinuous dark brown band extends obliquely across the apical area. The underside of the hind wing is tinged with ochraceous brown at the base and bears a subapical dark brown costal spot and a few brownish striae and minute spots. Both wings bear black discocellular spots, but these are faded in the present specimens. The head, thorax and abdomen are black, and the head and thorax are covered with short, greyish brown hairs.

♀ : The base of the costa on the upperside of the forewing is more heavily dusted with black scaling. The discocellular spot is larger than in the male. The apical area on the forewing is black, enclosing three, or four, elongate orange spots. The inner edge of this black area is rather diffuse and irregularly sinuate. In the hind wing the basal dusting with black is sparse and the subapical and marginal spots are much larger than in the male.

On the underside, the markings are much larger and more conspicuous than in the male.

In the dry season form, *aurora* (Cramer), the black markings are reduced.

Expanse: 40 - 45 mm.

Range : Ceylon to Central India.

Habits : This butterfly possesses a weak flight and keeps near to the ground. They are inhabitants of dry, open regions, and are generally found in large numbers along with other species that feed on plants of the family Capparidaceae (Capers). The food plant of this species is usually *Cadaba indica* Lamarck, which grows in waste places. The male rests on the ground frequently and in dull weather they are sluggish and easily captured. The females are less commonly seen.

Colotis danae danae Fabricius.

The Crimson Tip.

Plate X, fig. 6.

Specimens in the collection: Six, Madras and Godavari; 43 mm. The smallest specimen measures 36 mm., which is 4 mm. smaller than the minimum recorded expanse for this species. Specimens of this subspecies, especially the males, are subject to considerable variation.

Description : ♂ : The upperside is white. The forewing bears a broad triangular apical crimson area edged with black inwardly. The forewing is with or without a minute

discocellular spot. The hind wing bears a series of marginal black spots or sometimes connected into a marginal black band.

On the underside, which is white, the base of the forewing is tinged with sulphur-yellow and there is a brownish pink apical patch, not edged with black and often more or less suffused with grey. This patch bears near its inner edge an oblique series of four or five dark brownish or blackish spots.

The underside of the hind wing is sometimes simply pure white, but more often tinged with brownish pink to a varying degree. A small brown or black discocellular spot is present; this is sometimes annular, being centred with deep red. A curved discal, brownish band is also present. The head, thorax and abdomen are black, the head and thorax being covered anteriorly with brownish or greyish black hairs.

♀ : The upperside is white with the base of the wings heavily dusted with greyish black. In the forewing the crimson apical area is smaller than in the male, and is paler and sometimes reduced to a series of pale, rose-coloured sub-apical streaks. This area is always bordered with a black band distally and often on the inside also. The discocellular spot is larger than in the male. A post-discal, anterior, curved black band is also present. The crimson apical area is traversed by a line of small black spots. The upperside of the hind wing bears a dusky discocellular spot and a discal black, curved band. The marginal black spots are sometimes joined together to form a continuous band.

The underside of the forewing is white, tinged with bright yellow at the base of the cell and with a brown, grey or reddish tinge over the apical area. The discocellular band and the postdiscal band are as on the upperside. The underside of the hind wing is white, tinged with brown or pink. The discocellular spot is annular being centred with crimson. Marginal black specks, sometimes conneceted by a line, are present.

The dry season form (*taplini* Swinhoe) has the black markings much reduced and on the underside, the apical area and the entire hind wing are reddish brown.

Expanse: 40 - 50 mm.

Range: Ceylon and Peninsular India; Saurashtra to Baluchistan. This species is said to be common in the Palni Hills from April to June and August to October.

Habits: This butterfly flies straighter and more steadily than most species of *Colotis*. It is found more in open spaces than any other species of this genus. It keeps close to the ground. The females are seen more rarely than the males. The larva turns pink before pupating. The food plants of this species are species of *Capparis* (Capers).

Genus **Hebomoia** Hübner.

These are the largest of the Pierids (Whites) found in the Oriental Region, and includes the Great Orange Tips. The forewing is triangular with an arched costa and

more or less acute apex, and bears a large, black-edged orange patch over the apical half. The hind wing is broad and sub-ovate, with the apex and tornal angle broadly rounded. The males usually fly during the morning hours, but settle on damp patches of sand during the hotter part of the day. The females are less active and keep more to the bushes.

A single species, *Hebomoia glaucippe*, which is the only species of this genus recorded in the Indian Region, is represented in the Indian area by three subspecies. Of these, only one, H.glaucippe australis, distinguished by the inner black edging to the orange patch being narrow or obsolete, is represented in the collection.

Hebomoia glaucippe australis Butler.

The Great Orange Tip.

Plate X, fig. 7.

Specimens in the collection: Three, one from Coorg, one from Madras and one from the Nilgiris; 90 mm.

Description : ♂ : The upperside is white. The apical half of the forewing bears a large, black-edged orange patch, which generally overlaps the end of the cell. A series of black, transversely elongate, triangular black spots are present on this orange patch, a little distance from the outer margin. On the whole, the black markings are more reduced in both sexes in this form, than in the nominotypical form. The inner side of the orange area is edged narrowly with black, and in the dry season form, it is without any black edging. The hind wing bears a prominent black costal spot, which, however, is absent in dry season forms.

The underside of the forewing has the proximal area white and the apical area mottled brown or reddish. The underside of the hind wing bears dark brown mottling. In the dry season form, the brown mottling is paler and less well marked.

♀ : This resembles the male, but in addition to the usual markings it bears a prominent row of discal spots on the hind wing. The black markings are less extensive than in the nominotypical form and the inner black edging to the orange area is reduced to a greater extent. The thorax and abdomen are white, thick and robust, the thorax being clothed with stiff white hairs. The club-shaped terminations of the antennae are gradually enlarged.

Expanse : 80-100 mm.

Range : Ceylon and Peninsular India.

Habits : These large butterflies are fairly common and are among the most powerful of all the Pierids found in India. They have a very strong, powerful and swift flight. They are sunloving butterflies, and often rest on damp ground or settle on flowers. In flight, the wings are held half closed and motionless when gliding down from a height. When

they settle, they fold the forewings back within the hind wing in such a way that only the markings on the hind wings and on the tips of the forewings are seen, making it very difficult to detect them when they settle on the ground. This is a remarkable instance of protective colouration. It is found all over Peninsular India wherever there is heavy rainfall and the country is hilly and wooded. In South India, it is found up to an altitude of 7000 feet.

Genus **Valeria** Horsfield.

(Formerly **Pareronia** Bingham).

This genus includes the butterflies known popularly as the Wanderers. They are large butterflies. In the forewing, the costa is strongly arched and the apex is blunt. The outer margin is slightly sinuate and the tornus rounded. The hind wing is subtriangular with the cell elongated and more than half the length of the wing. The males are pale bluish white, sometimes pale bluish green, with black borders and with the veins darkened. The females bear a distinct striped pattern mimicking the Blue Tiger, *Danais limniace*, very strongly. The food plants of the larvae are Capers.

Two species, *Valeria ceylanica* (Felder) and *Valeria valeria* (Cramer) are represented in the collection, each by a single subspecies.

Valeria ceylanica (Felder).

The Dark Wanderer.

Description : ♂ : The upperside is bluish green with the veins strongly darkened. The outer black border on both wings is broad and seldom spotted.

♀ : The upperside bears bluish markings, and small submarginal spots, the spot in area 3 of the forewing being shifted inwards.

This species is usually found only in thick jungles in South India, in places where the rainfall is heavy, but in Ceylon, it is common also in the drier regions.

Valeria ceylanica ceylanica (Felder).

The Dark Wanderer.

Plate X. fig. 8.

Specimens in the collection: Two, Madras; 65 mm.

Description: This closely resembles the next subspecies, *Valeria valeria hippia*, but differs from it in the following respects :

♂ : The upperside is of a deeper bluish white colour. The outer black border on the forewing is much broader and usually without submarginal spots or at most only one or two of these spots are present. The outer black border on the hind wing is very broad.

The underside is as in *hippia*.

♀ : This resembles the female of *hippia*, but on the upperside the outer black markings on both the wings are much broader. The submarginal spots are placed farther away from the margin than in *hippia*.

On the underside, the black marginal borders are broader and darker and the submarginal spots on the apex of the forewing and on the hind wing are absent or very faintly marked.

Expanse : 65-80 mm.

Range : Ceylon and Peninsular India.

Habits : This butterfly frequents thick jungle, usually at the foot of the Ghats and ascends up to about 3000 feet in South India. Its flight it strong, but is usually keeps to the shade and to the undergrowth. The male is very swift in its flight and only occasionally settles on flowers. The female is seen much less often and is slow in her flight, often resembling the Danaid which she mimics, and is generally seen fluttering around in the undergrowth.

Valeria valeria (Cramer).

The Common Wanderer.

Description: This species is divided into two groups, the *Valeria* and *Hippia* groups, distinguished from each other by the form of the genital armature. Only the latter group is represented in the Indian area.

♂ : The upperside is bluish white, paler than in *ceylanica*, with all the veins strongly blackened. The forewing bears submarginal spots on the broad, blackened border. The underside is also whiter than in the preceeding species.

♀ : Two forms of the female occur. The more common form resembles the female of *ceylanica*, but is whiter. The marginal markings on the hind wing are prominent.

Veleria veleria hippia (Fabricius).

The Common Wanderer.

Plate XI. fig. 1.

Specimens in the collection: Two; of these one is from Rangoon, Burma; 74.5 mm.

Description : ♂ : The upperside is pale blue with all the veins defined with black. The forewing has the costa, apex and outer margin broadly bordered with black. A series of submarginal bluish white spots are present on this broad, black border. The spot in area 3 is shifted inwards. On the hind wing, the outer margin is broadly black, the black area being covered with androconia (except at the tornus).

The underside is of a paler blue tint, with the outer margin bordered with dark brown and bearing a series of indistinct crescent-shaped submarginal spots. In the hind wing veins 6, 7 and 8 are broadly edged with black.

The head, thorax and abdomen are dark brown, the thorax being clothed with long bluish hairs. The underside of the abdomen and thorax is pale silvery bluish white.

♀ : The upperside is black with bluish white markings. The forewing bears a series of post-cellular stripes of varying lengths. A submarginal series of spots are present, the one in area 3 being shifted inwards.

The underside is similar to the upperside, but duller, with the black margins broader, but less sharply defined.

The two specimens represented in the collection are males.

There is another, much rarer form of the female, known as *philomela* (Fabricius) in which the base of the hind wing on the upperside is suffused with bright yellow. It mimics *Danais aspasia.*

Expanse: 65-80 mm.

Range: India to Burma and Siam.

Habits: This butterfly keeps more to pen woodland than the preceeding subspecies and frequents drier regions. In other respects its habits are more or less similar to those of the preceeding subspecies. It keeps to low altitudes and feeds on the same food plants. It is a sun-loving species. The females are more sluggish in their fight and mimic the Danaids very closely, and sometimes, strangely enough, in regions where the species mimicked are absent.

Subfamily **COLIADINAE.**

The Yellows.

This subfamily includes butterflies in which the wing colouration is usually yellow or orange. In the forewing, vein 6 always branches off from vein 7 and veins 7 and 8 are coalescent. The precostal vein in the hind wing is greatly reduced or absent. The food plants of the larvae of the species belonging to this subfamily belong mostly to the natural order Leguminosae.

Four genera of this subfamily are represented in the collection.

Genus **Catopsilia** Hübner.

This genus includes the butterflies commonly known as the Emigrants. They are large, white or yellow butterflies, with black terminal and other markings on the wings. There is considerable seasonal variation in the wing colouration. The females are always

more heavily marked than the males. The forewing is elongate and the costa widely arched. The apex is more or less acute. The tornus is broad and the inner margin long. The hind wing is very broad with the costa strongly arched, the tornus being angular and well defined. The cell is short and broad. The males bear sex marks in the form of spots and other markings on the wings. On the underside of the forewing near the base of the inner margin is a long hair pencil, and on the upperside of the hind wing there is an oval patch of scent scales near the base *(androconia).*

All the species of this genus are extremely common and sometimes congregate in large numbers. They are often seen on migratory flights and settle frequently on flowers and in damp places. The larvae which feed on species of *Cassia* often do great damage to the foliage.

Catopsilia crocale crocale Cramer.

The Common Emigrant.

Plate XI, fig.2

Specimens in the collection : Twenty three, from various localities such as Madras, Nilgiris and Cochin. There is considerable colour variation in this species; 64 mm.

Description : ♂ : The upperside is chalky white with the proximal areas coloured yellow or entirely suffused with yellow. The male is always sulphur-yellow basally and the female is usually so.

On the forewing the costa is narrowly black to the base and the outer margin also bears a narrow black border which widens at the apex. The hind wing is as a rule unmarked but rarely it is marked with black dots on the margin.

The underside is yellow or yellowish white, without markings. The underside of the forewing is often white in the posterior part of the distal area.

♀ : The upperside varies in colour, being of some shade of yellow or sometimes white. The forewing bears a black discocellular spot which is usually connected to the costa by a black bar. The outer marginal black border is white at the apex and reaches the tornus. The inner edge of this black border is more or less dentate. The apex is spotted with patches of the ground colour. An anterior post-discal black band is sometimes present. The hind wing bears an outer marginal black border more or less dentate on its inner edge. The underside is similar to the male but the colouration varies from yellow to ochraceous brown, and in some specimens the underside of the hind wing bears large reddish brown patches.

There are several forms of this race. The present specimens belong to the commonest form, *alcmeone,* in which the proximal parts of the wings are yellow and the distal parts white, in the male.

Expanse : 55 - 75 mm.

Range : This species has a very wide range of distribution, ranging over India, Burma, Ceylon and eastwards from Andaman Islands to South China, Java, Sumatra, Borneo and the Philippines.

Habits: This is one of the commonest species found in and around Madras. Their flight is fast and powerful, They progress in a series of broad, curved, upward and downward bounding movements. They settle on flowers in large numbers during and after the rains. The males frequently settle on damp patches of earth in large numbers. They are found both in the plains and on the hills up to an altitude of 8000 feet. They are most abundant during the latter part of the monsoon and after the monsoon, but in those parts with heavy rainfall they are found almost throughout the year.

Curiously enough, the Lemon Emigrant, *Catopsilia pomona*, which closely resembles the above species, and is also a very common species, is not represented in the collection.

The larvae of these species are able to escape from their enemies by means of a protective device; they can jump to a height of eight inches and exude a greenish, nauseating fluid from their mouth.

Catopsilia pyranthe pyranthe (Linnaeus).

The Mottled Emigrant.

Plate XI, fig. 3.

Specimens in the collection: Twenty - four specimens, all from Madras; 50 mm. The smallest specimen is 40 mm., 10 mm. smaller than the minimum recorded expanse for this species.

Description : ♂ : The upperside is chalky white, tinged with pale green in some specimens. The forewing bears a discocellular black spot, which may be occasionally absent. The costa is edged with black. An outer marginal black border is present on the forewing, wide at the apex and narrowing slightly behind and finally disappearing towards the tornus; the inner edge of this black border is slightly indented, being produced on the veins. The hindg wing is white, with the marginal black border very narrow and continuous or absent altogether.

The underside is greenish mottled with fine reticulating reddish brown or green lines and small discocellular spots.

♀ : This resembles the male, but all the black markings are broader and the discocellular spot on the forewing is larger. A narrow, black costal border is present on the forewing, and below the apical area there is usually an anterior, short, black, post-discal band which is sometimes widened and more or less coalescing with the marginal border. The hind wing bears a narrow marginal black band and usually a few postdiscal spots are also present.

PLATE XI

PLATE XI

Fig. 1. *Valeria valeria hippia* (Fabricius) (x $^3/_4$).

" 2. *Catopsilia crocale crocale* Cramer (natural size)..

" 3. *Catopsilia pyranthe pyranthe* Linnaeus (natural size).

" 4. *Catopsilia florella gnoma* (Fabricius) (natural size).

" 5. *Gonopteryx rhamni nepalensis* (Linnaeus) (natural size).

" 6. *Eurema brigitta* Cramer (x 1 ¼).

" 7. *Eurema blanda silhetana* (Wallace) (natural size).

" 8. *Eurema hecabe simulata* (Moore) (x 1¼).

The underside is as in the male, but the discocellular spots are more sharply defined and ocellate in appearance with a red ring enclosing a silver grey spot. A post-discal series of reddish brown spots are present in both the wings. The thorax is covered posteriorly with long white hairs. The head and thorax are brown and the abdomen white.

Expanse: 50 - 70 mm.

Range: Ceylon, India, Burma and Andaman Islands, extending to Hainan, Formosa, South China and eastwards to Java, Borneo and the Philippines. It is common in the Indian Region.

Habits: This species is very closely allied to *C.florella* and indeed it is doubtful whether these two can be seperated as distinct species. The markings in both species show considerable variation and the characters overlap in many specimens to such an extent that it is often impossible to say to which species a specimen belongs. It is quite probable that *C. florella* is a dry season form of *C. pyranthe pyranthe*, as it has been observed that in the same region where *C. Pyranthe pyranthe* abounds in the monsoon, *C florella* appears after the rains, when the former begins to be scarce. In habits, these are similar to the preceding species, except that their flight is much weaker and more irregular and jerky.

Catopsilia norella gnoma (Fabricius).

The African Emigrant.

Plate XI, fig.4.

Specimens in the collection: One, but its exact locality is not known; 60 mm.

Description: This is synonym of *Catopsilia thisorella* Moore, by which name this was known formerly.

♂ : The upperside is white, with reddish brown markings. Forewing with the costa and apical area marked reddish brown. The terminal margin is also bordered with reddish brown, the inner edge of this border being produced a little inwards along the veins. A prominent black discocellular spot is present. There is considerable variation in the size and extent of these markings. The hind wing usually bears a marginal yellowish pink line, but in the present specimen the margin is edged with a very narrow blackish brown border.

The underside is very similar to that of *C. Pyranthe pyranthe*, but the discocellular spots are more prominent.

♀ : The upperside is greenish yellow and the markings are more distinct than in the male. The discocellular spot is also larger and more prominent. The hind wing sometimes bears small marginal brown spots.

The underside is as in the male, but the fine lines are more prominent and reddish brown. The hind wing bears three discal spots of which the largest is the one at the end of the cell.

The name *thisorella* is now applied to an extreme dry season form in which the underside is deep yellowish brown and the marginal markings on the upperside of the forewing are reduced or absent.

Expanse : 50 - 70 mm.

Range : Ceylon, India, Burma and Andaman Islands. But it is rare on the Andaman Islands.

Habits : The habits are very similar to those of the preceding species, but they begin to appear abundantly only after the rains. This is the Indian subspecies of the African Emigrant. *Catopsilia florella* which is much more widely distributed, its distribution ranging over Africa, Arabia, Persia, India, Burma, Ceylon and Andaman Islands, Indo-china and South China.

Genus Gonepteryx Leach.

This genus includes the butterflies commonly known as the Brimstones.

Description : ♂ ♀ : The costa on the forewing is strongly arched near the apex, and more or less straight or slightly depressed in the middle. The apex is acute and falcated. The outer margin is concavely excavated below the apex and posteriorly convexly rounded. The cell is elongated, being more than half the length of the wing.

The hind wing is broadly ovate with the outer margin produced into a prominent tooth-like protruberence at vein 3. The margin is also slightly dentate at the terminations of veins 2 and 4.

The antennae are short, with compressed, club-like termination. The head bears a pointed tuft of silvery grey hairs.

Species of this genus have a wide distribution, mostly outside Indian limits, ranging over Burma, siam, Andamans, Persia, etc. The only subspecies represented in the collection, namely, *Gonepteryx rhamni nepalensis* has a range extending from Chitral to Northern Burma and is said to be abundant at Mussooree at certain seasons. This is the only common species of this genus occurring in India. No representative of this genus occurs in South India or Ceylon.

Gonepteryx rhamni nepalensis (Linnaeus).

The common Brimstone.

Plate XI, fig.5.

Specimens in the collection : Three; their locality is not recorded : 56 mm.

Description : ♂ : The upperside of the wings is coloured rich yellow. There are marginal reddish brown vein dots on both the wings. There is a deep orange discocellular spot on both the wings, the spot on the hind wing being much larger. The apex is strongly falcate in the forewing. The marginal spots form a more or less continuous line on the forewing.

The underside is pale yellowish green, the posterior discal and basal areas on the forewing being usually sulphur yellow. The hind wing is toothed at vein 3.

♀ : The upperside is pale creamy white, the reddish brown markings and the discocellular spots being similar to those in the male.

The underside is greenish white, the posterior two-thirds of the forewing being white. The discocellular spots are duller than on the upperside.

The abdomen is black above and white laterally.

Both the sexes have the thorax clothed heavily above with silvery grey hairs.

Expanse : 60 - 70 mm.

Range : Chitral to Northern Burma. This subspecies is said to be abundant at Mussooree and at Murree during the summer months.

Habits : There is considerable variation in this form. These butterflies frequent open patches of grass and damp places. They are common in the North west Himalayas above an altitude of 5000 feet from March to October. Their flight is fairly strong and both sexes are known to haunt flowers. The remarkable sexual dimorphism in this form is characteristic.

Genus **Eurema** Hübner.

(Synonym : **Terias** Swainson).

This genus includes the butterflies popularly called the Grass Yellows. They are small fragile butterflies, with the forewing not exceeding about 28 mm. in length. They are bright yellow with characteristic black terminal and apical markings. The forewing has the costa arched and the apex generally more or less rounded. In a few forms the apex is pointed. The outer margin is straight and the tornus rounded. The inner margin is comparatively very long. The hind wing is broadly ovate or pear-shaped, with the costa arched and the apex and outer margin continuous and broadly curved. The tornus is obtusely angular.

These butterflies flutter unsteadily among stems of grass and low bushes in grassy places and frequently rest on the stems of grass, or on flowers and damp patches of the earth. They are most active during the early hours of the morning and again in the evening. The males are gregarious, often collecting in large numbers in damp localities.

The species of this genus are divided into several distinct groups based on their secondary sexual and other characters. Four of these species are common and familiar butterflies found all over India and Ceylon.

BRIGITTA GROUP

The upperside of both the wings is devoid of discocellular ring-spots. The upperside of the forewing with the black border not continued along vein 1. The underside of the forewing bears two, small, black discocellular spots. The upperside of both wings usually with broad, black, apical and terminal borders.

Eurema brigitta Cramer.

Plate XI, fig 6.

This is a synonym for *Terias libythea* Watson, by which name this species had been more familiarly known till recently.

Specimens in the collection : Seven, from Nilgiris, Pulneys and Trivandrum; 35 mm.

Description : ♂ : The upperside is bright orange yellow with forewing bearing a broad, black border over the apex and terminal margin. The inner edge of this black border is regularly incurved from costa to the inner margin and slightly dentated on veins 1 a to 3. The forewing is more elongate and narrowed towards the apex than in other species of this genus. The basal area is dusted with black in both the wings. In preserved specimens, the black border often fades into chocolate brown. The hind wing bears a black outer border which is broader anteriorly. This black border is broader in the typical wet season forms than in the dry season forms in which it is reduced to a very narrow marginal band. Two of the seven specimens represented in the collection show this feature and hence may be assigned to the dry season form which is designated by the name *rubella* (Wallace). In these forms the marginal band is sometimes broken up into linear spots posteriorly.

The underside is more or less of the same ground colour as the upperside. The underside of the forewing is narrowly bordered with pink. Two minute black discocellular spots and a few obscure black specks are present. The underside of the hind wing bears a basal spot, three transversely extended spots and a loop-like, discocellular black spot; obscure, postdiscal bands are present. Both wings bear minute, black marginal vein dots on the underside. The head, thorax and abdomen are dusky black above, with a few yellow hairs on the thorax. The undersides of the thorax and abdomen are pale yellowish.

♀ : This resembles the male, but with the black marginal borders relatively broader.

There is not much variation between the seasonal forms, but as mentioned above, the dry season form, *rubella* (Wallace) is distinguished mainly by the much narrower black border on the hind wing.

Expanse : 30 - 40 mm.

Range : Ceylon, India and Burma, extending as far as Nicobar Islands and South China.

Habits : This is very common species of Grass Yellow, found almost everywhere on the plains as well as in the hills. They ascend up to an altitude of 12,000 feet in hilly localities. They are very abundant in the hot weather in the rocky beds of the rivers in Canara. Their flight is weak, being more of an unsustained fluttering; it keeps mostly to bushes close to the ground and sometimes they congregate in large numbers in low bushes and damp situations. They also frequently settle on flowers near the ground.

HECABE GROUP.

The males of this group may be distinguished by the presence of a narrow, grey sex brand on either side of the median vein, on the underside of the forewing. The outer black border on the forewing is deeply excavated between veins 2 and 4 (except in dry season forms) and continued up to the tornus. Of the eight species of this group inhabiting the Indian area, only two are represented in the collection, each by a single race.

Eurema blanda silhetana (Wallace).

The Three-spot Grass Yellow.

Plate XI, fig. 7.

Specimens in the collection : One, belonging to the dry season form, from Peninsular India; 43 mm.

Description : This subspecies is subject to considerable variation and as the characters are not very constant, it is not possible to distinguish between the various forms easily. However, the present specimen seems referable to the form *rotundalis* Moore. Most of these so called forms represent only seasonal variations.

Dry season form : ♂ ♀ : This is very similar to the succeding species, the Common Grass Yellow. The markings are variable. The upperside is richly citron-yellow coloured. The forewing bears a black outer border which is broad in the apical area but narrowed behind and strongly concavely excavated below vein 4, resembling the condition in the next species, but the excavation is comparatively broader in the present species. The hind wing bears a narrow marginal black line enlarged into conspicuous dots at the terminations of the veins. The marginal line may sometimes be interrupted or thickened into a band.

On the underside, the ground colour is slightly paler, and the markings are of a rusty brown colour, and very similar to those of the dry season form of the Common Grass Yellow. The underside of the hind wing always bears a minute reddish brown dot

at the extreme basal end of the cell in addition to the two small black spots (which are present in the Common Grass Yellow). The apical reddish brown patch is much larger and more diffuse than in the Common Grass Yellow. The sex brand in the male is narrower than in that species.

Wet season from : This is designated as *uniformis* and is distinguished by the black border on the upperside of the forewing being broader and the markings on the underside being more sharply defined.

Expanse : 40-50 mm.

Range : Ceylon, Peninsular India to Sikkim, Assam and Burma; Andaman Islands.

Habits : This is a common subspecies of Grass Yellow, found at low altitudes up to about 2500 feet. In some parts of South India, this species is even more common than the Common Grass Yellow. Its eggs are laid in clusters on the upperside of a leaf or young shoot. The food plant is *Wagatea spicata* (family Leguminosae), a large creeper that climbs over the tallest trees. This butterfly flies high up around the tree tops, this habit being correlated to the situation of its food plant.

Eurema hecabe (Linnaeus).

This is a widely distributed species occuring throughout the whole of the Ethiopian and Indo-Australian Regions, extending northwards to Korea and Japan. This is one of the most variable of the Indian species of *Eurema* and as the characters are not constant, many of these variations cannot be separated as distinct races.

The typical form of this specis bears two cell spots on the underside of the forewing and the presence of a sex brand on the underside of the forewing almost always distinguishes the male of this species.

Of the several races of this species found in the Indo-Australian Region, only one, *Eurema hecabe simulata* (Moore), is represented in the collection, this being the race that is found in Ceylon, Peninsular India and Central Provinces.

Eurema hecabe simulata (Moore).

The Common Grass Yellow.

Plate XI, fig. 8.

Specimens in the Collection : Nineteen; Madras, Godavary, Pulneys and Coorg; 39 mm. The smallest specimen is 36 mm., 4 mm. less than the minimum recorded expanse. Almost all the specimens in the collection belong to the wet season form.

Description : ♂ : The upperside is yellow, varying in shade from a bright sulphur yellow to a rich lemon yellow. The forewing bears a deep black outer border (which in preserved specimens fades to chestnut brown). This black border is continued as a

narrow band along the costal margin up to the base. The inner edge of this border is deeply excavated between veins 2 and 4. Below vein 2, the black area is abruptly expanded into a squarish patch occupying the entire tornal angle. The hind wing bears an outer narrow black border which is variable in width, and the inner edge of which is rather ill-defined in most specimens. The inner margin of the hind wing bears a broad, conspicuous area which is paler than the ground colour.

On the underside, the ground is usually paler than that of the upperside. The spots and markings are of a reddish brown colour. The forewing bears two small black spots in the basal half of the cell and a bean-shaped discocellular spot or ring. A prominent brown sub-apical patch extends down from the costa. A sex brand is present on both sides of the median vein. The underside of the hind wing bears a series of three small spots near the base and an irregular narrow discocellular spot. A series of irregular, curved streaks are present in the post-discal area, Irregular, reddish brown costal and marginal specks are present in both the wings. These markings are more or less reddish brown. In the extreme wet season form, the brown markings are absent.

♀ : On the upperside the black marginal borders are slightly broader, the inner edge of this band on the hind wing being diffuse. The underside is as in the male.

In the dry season form, designated *asphodelus* (Butler), the black borders on the upperside of the wings are much narrower.

Expanse : 40 - 50 mm.

Range : Ceylon, Peninsular India and Central Provinces.

Habits : Specimens of this race are very common in and around Madras. In fact, this is the commonest subspecies of the genus met with in Southern India and Ceylon. Its larvae feed on a variety of food plants, *Cassia, Acacia and Caesalpinia* being the most usual among them. This butterfly is found all over Peninsular India up to an altitude of 9000 feet and is plentiful throughout the year.

Genus **Colias** Fabricius.

This genus includes the butterflies popularly known as the Clouded Yellows. Although this genus includes about fourteen species, most of them occur in remote mountainous tracts and only two species may be said to be common. They are orange or yellow butterflies with black outer borders which are usually spotted with markings of the ground colour. These spots may sometimes be absent. These butterflies are inhabitants of open country on the hill sides and are fast fliers. They are commonly found settling on flowers.

Description : ♂ ♀ : The costa on the forewing is arched at the base, but is then continued straight up to the apex which is obtuse. The outer margin is slightly convex. The tornus is obtusely angulated. The hind wing is straight. The hind wing is broadly oval; the cell on the hind wing is elongate, being more than half the length of the

wing. The head is covered with a tuft of long hairs in front. The club at the end of the antenna is gradually enlarged.

Two subspecies of *Colias erate* (formerly known as *Colias hyale)* are represented in the collection. One specimen in the collection labelled *Colias phicomene* (54 mm.) appears to be an exotic form. (Plate XII, fig. 1).

Colias erate erate (Esper).

The Pale Clouded Yellow.

Plate XII, fig. 2.

Specimens in the collection : Three, two of which are females and one male; 48 mm. Their exact locality is not recorded.

Description : ♂ : The upperside is lemon yellow; the base of both the wings and the posterior half of the hind wing are dusted with black scaling. The forewing bears a small, oval, discocellular black spot. The apex and outer margin bear a broad, black border, narrowing behind towards the tornus. Submarginal spots of the ground colour are usually present on this black apical area, but may be sometimes absent. The hind wing bears a fairly large bright orange yellow discocellular spot which is rendered double by a slight constriction in the middle. The outer margin of the hind wing bears a narrow black border which is often broken up into marginal spots on the terminations of the veins.

The underside is lemon yellow. The forewing bears, in addition to the discocellular spot, a post-discal row of black spots, which become reddish anteriorly. The hind wing bears a double silvery discocellular spot, each ornamented with an inner and outer red ring, but in some specimens the outer ring is absent. A post-discal curved series of rather faint red spots are present. Both wings bear a marginal salmon pink line.

♀ : In this the ground colour is paler yellow or white but the markings are more or less similar to those of the male.

Expanse : 45-55 mm.

Range : Baluchistan, Himalayas, from Chitral to Kumaon.

Habits : This is an extremely variable subspecies, and several local forms have been recognized. In the Himalayas, the white female is the commonest form. This butterfly frequents open country between 5000 and 11,000 feet on the Himalayas. Its flight is fast. It generally flies close to the ground and frequently settles on flowers growing close to the ground. On the North-west Frontier this species frequents lentil *(dhal)* and other cereal crops, on which the larvae feed. In the Himalayas, it is found from March to July and again after the rains.

The three specimens in the collection referred to this subspecies were originally labelled *Colias hyale*, but this is a distinct species not represented in India.

Colias erate nilagiriensis C. & R. Felder.

The Pale Clouded Yellow.

Plate XII. fig. 3.

Specimens in the collection: Eight, Pulneys and Nilgiris, South India. In some of these the wings are in a bad state of preservation: 40.5 mm. The smallest specimen measures 35 mm., which is 10 mm. less than the minimum recorded expanse.

Description: ♂ : The upperside is of a deeper and brighter colour than in the preceding race which is the nominotypical form of this species. The outer black area on the forewing is broader and the submarginal spots are smaller. The basal black dusting is spread over a more extensive area in both wings. A prominent black discocellular spot is present on the forewing and a dull orange spot on the hind wing.

The underside is also of a deeper yellow ground colour and the entire hind wing and the apical and costal areas of the forewing are densely dusted with black. This gives the underside a greenish tinge.

♀ : The upperside is white, densely dusted with black scaling over the entire hind wing and over the basal area of the forewing. The outer black border on both wings is broader than in the preceding typical race. The forewing bears two conspicuous white submarginal spots.

The underside of the forewing is white, the apex being greenish yellow. A black discocellular spot is present. The underside of the hind wing is greenish yellow, with a silvery ocella-like discocellular spot bordered by an orange ring.

Expanse: 45 - 50 mm. As a rule, these are smaller than those of the nominotypical race.

Range: Peninsular India; hills of Southern India.

Habits: These are much the same as those of the nominotypical race. The larvae of this South Indian race have been observed to feed on the leguminous plant, *Parochetus communis*.

Family DANAIDAE.

This family includes large butterflies, with a tough, leathery body and ample wings. The cells of both the fore and hind wings are closed. Vein 1 in the forewing is forked close to the base. In both the sexes, the front legs are reduced and non-functional. They are usually kept pressed against the underside of the thorax. The body is rather slender, although tough and the antennae are slender and filiform with two grooves on the underside. The eyes are naked, not hairy.

These are extremely tough and hardy insects and are perhaps the most effectively protected among all the butterflyies. They possess an unpleasant smell and their taste is nauseating to other creatures. This, coupled with their remarkable toughness and tenacity to life, has enabled them to be most successful among butterflies in their struggle for existence. They also possess the power of shamming death. Species which are not distasteful have also acquired immunity against their enemies by mimicking the Danaids. Many species of Swallowtails and Pierids are examples of such mimicry. They are slow in their flight. Secondary sexual characters in the form of specialized patches of scent scales and hairs are present in most species, in the males. The larvae are also protected by their unpleasant odour and taste, but they fall an easy prey to ichneumon wasps.

This family is mainly tropical and subtropical in its range, and includes three genera, *Hestia*, the tree nymphs, *Danais*, the Tigers, and *Euploea*, the Crows, distinguished as follows:

Hestia : The wings are of comparatively large expanse; the antennae are filiform, and the colour of the wings in both sexes is conspicuously black and white,

Danais ; These are brightly coloured, brick-red, blue-striped or black insects.

Euploea ; These are glossy black, with white spots; some of these butterflies are beautifully tinged with glossy blue-black. The antennae are distinctly clavate.

All the three genera are recorded from South India and are well represented in the Museum collection.

Genus **Hestia** Hübner.

The Tree Nymphs.

These are large butterflies with a very wide expanse of wings and long and slender bodies. The forewing is elongate and narrow or sometimes comparatively short and broad. The costa is widely arched. The hind wing is elongate and broadly ovate, with the termen more or less strongly arched. The cell is more than half the length of the wing in both fore-and hind wings. The antennae are long and filiform.

This genus is divided into two groups, the *Lyncea* group and the *Labia* group. Of these, the former alone is represented in the Indian Region. A single species, *Hestia lynceus* is represented in the Museum collection by its single subspecies, *Hestia lynceus malabaricus*.

Hestia lynceus Moore & de Niceville.

These are large butterflies with semi-transparant, greyish white wings, bearing large, black spots. The male and female are similarly coloured. The Ceylon and Western Indian races are similar. The race represented in the Museum collection is the Western Indian race, *Hestia lynceus malabaricus* Moore.

Expanse: 110 - 1160 mm.

PLATE XII

PLATE XII

Fig. 1. *Colias phicomene* (Exotic form) (natural size).

" 2. *Colias erate erate* (Esper) (natural size).

" 3. *Colias erate nilagiriensis* C. & R. Felder (natural size).

" 4. *Hestia lynceus malabaricus* (Moore (x ½).

" 5. *Danais plexippus* (Linnaeus) (x $^{3}/_{4}$).

" 6. *Danais chrysippus* (Linnaeus) (x $^{3}/_{4}$).

" 7. *Danais limniace mutina* Fruhstorfer (x $^{3}/_{4}$).

" 8. *Danais melissa dravidarum* Fruhstorfer (x $^{3}/_{4}$).

Hestia lynceus malabaricus Moore.

The Tree Nymph.

Plate XII. fig. 4.

Specimens in the collection : Two, one from Malabar, and the other from Coorg; 130 mm.

Description : ♂ ♀ : The upperside is semitransparent and greyish white,sometimes suffused with a dusting of black scales. The wings bear an elaborate pattern of black markings. The veins are narrowly margined with black. In the forewing, large sub-basal spots in areas 1 and 2 and a large oval spot in the cell crossing three more or less parallel black streaks are present. A narrow black spot is present above it in interspace II. Three rows of large black spots are present on the outer half of the wing. The discal series of spots are more or less triangular, the pointed ends pointing outwards. The subterminal series of spots are arranged in pairs, coalescing on the veins and the marginal series are elongate overlying the veins. The markings on the hind wing are more or less similar. The cell bears two streaks (thicker than the cell streaks in the forewing), the upper being forked towards the apex. Paired black spots are present on veins 5, 6 and 7.

The underside is similar to the upperside in its markings.

The antennae are black, and the head and thorax streaked and spotted with black. The abdomen is white, with a broad, dull black band above.

Expanse: 120 - 154 mm.

Range: Western Ghats, Travancore.

Habits: This is the slowest of all Indian Butterflies. It scarcely moves its wings while in flight and appears to waft effortlessly in the air. It is found in groups of three or four flying high in thickly wooded areas. In the Western Ghats,it is confined to the thick, moist, evergreen jungles between 1000 and 3000 feet. It is easily caught when it comes close to the ground. It is one of the largest of Indian butterflies and is easily recognized by its characteristic spotted and streaked pattern of markings.

Genus **Danais** Latreille.

This genus includes the butterflies popularly known as the Tigers. These are large, black, dark brown or tawny butterflies with transparent markings and sometimes with white-spotted black apex on the forewing.

The forewing is triangular, with widely arched costa and broadly rounded apex. The termen is either straight or slightly concave below the apex. The hind wing is ovate or pearshaped. The cell is long, more than half the length of the wing in both the wings. The antennae are rather short, being less than half the length of the forewing. The club is only gradually enlarged.

This genus may be broadly divided into two groups according to the nature of the markings and the general colouration of the wings. In the first group, the Glassy Tigers, the wings are black or dark brown, with pale, transparent streaks, discal spots and streaks,and terminal and marginal spots. The spots of the teminal series are small. The males usually have patches of scent scales on the hind wing. In the second group, which includes the Tawny Tigers, the forewings are tawny, with a black apical area spotted with white. The males bear a pouch on the hind wing. Butterflies of both groups are gregarious.

Six species,most of which are common in South India, are represented in the collection. Of these *Danais plexippus* and *D. chrysippus* belong to the group of Tawny Tigers, and the rest to that of the Glassy Tigers.

This genus has a wide range of distribution, extending over the Himalayas, Nepal, Assam, Burma, Nicobars, Siam, China and the Malayan Sub-region.

Danais plexippus (Linnaeus).

The Common Tiger.

Plate XII, fig. 5.

Specimens in the collection: Five, Madras, Pulneys, Mysore, Godavary and Wynaad; 84 mm.

Description : ♂ ♀ : The upperside of both the wings is tawny, with all the veins broadly blackened. In the forewing, the costal and dorsal margins and the apical half of the wing are black and the interspaces between the veins behind the apical area are tawny. The veins bear broad,black borders. The terminal margin is black, with two rather irregular series of white spots. The black apical area is traversed by a series of elongated, white,more or less oblong spots. The hind wing is tawny, the veins being broadly bordered with black. The terminal margin is black, with two more or less complete series of white spots. The male bears a pouch on the hind wing.

The underside is more or less similar to the upperside,but the ground colour of the hind wing is paler and the apex of the forewing is dusky brown instead of being black. The antennae are black and rather short and slender. The head and thorax are black, spotted with white. The abdomen is tawny brown, spotted with white below.

Expanse: 75 - 100 mm.

Range: India, Ceylon and Burma, and extending to the Malay Peninsula.

Habits: This is a brightly coloured butterfly, frequenting lighthtly wooded country and scrub jungle. It is specially plentiful in areas having heavy rainfall. Its flight is weak, as in other species of the genus. It is less common than the next species, the Plain Tiger. It associates with other species of Danaids on migration.

Danais chrysippus (Linnaeus).

The Plain Tiger.

Plate XII, fig. 6

Specimens in the collection : More than a dozen most of them from Madras; 78 mm.

Description: ♂ ♀ : Upperside : The forewing is tawny red, paler over the dorsal area and darkening towards the costal margin. The costa and apex are black. The apical dark area is crossed by a white oblique bar,with one inner and two subterminal white spots below its lower end. Two or three small white spots are present at the apical margin. A series of terminal white spots of varying size are present. The termen of the forewing is more concave than in the preceding species.

The hind wing is paler with the termen bearing a narrow black border which is marked by a series of white spots, this series being incomplete aove. A fairly large black spot is present near the base of vein 2, but this is absent in two of the specimens contained in the collection. In addition to this, there are three much smaller black spots on the border of the cell. In both wings,the veins are not blackened as in the preceding species.

The underside is similarly coloured, but paler. The hind wing and a triangular area at the apex are ochraceous brown on the underside. The white markings are also more sharply defined on the underside.

The antennae are black and the head and thorax are black, spotted with white. The abdomen is brownish above and whitish beneath.

Expanse: 70 - 800 mm.

Range: Throughout India, Burma and Ceylon.

Habits: This is one of the commonest and most familiar of Indian butterflies. It may be seen flying at all hours of the day in gardens and groves visiting flowers, hovering among bushes not far above the ground. In the evenings they are frequently seen fluttering about among grass and low bushes before retiring for the night. The females may be frequently seen flying in search of suitable plants on which they may lay their eggs. The eggs are laid singly in the underside of leaves. This butterfly inhabits all types of country and ascends the hills up to 9000 feet. It is essentially an insect of the gardens and open country. The female of *Hypolimnas missippus* mimics the present species very strikingly.

Danais limniace mutina Fruhstorfer.

The Blue Glassy Tiger.

Plate XII, fig. 7.

Specimens in the collection: Nine, Pulneys,Mysore, Kurnool, Godavary and Madras; 90 mm. The smallest specimen measures 80 mm., 10 mm. smaller than the minimum recorded expanse.

Description: ♂ ♀ : The upperside is black, with large, irregular white or bluish white, semi-transparent markings. A slender streak is present extending from the base in the cell and at the apex of the cell there is a large white spot indented on the outside. A large oval spot is present at the base of area 2 and another similar spot at the base of area 3. A somewhat irregular series of subterminal and terminal spots are present, the latter being the smaller. A few very narrow and slender, oblique,white, sub-apical streaks are present.

In the hind wing, the cell is almost entirely white with a median narrow black streak which is forked at its end. The width of this narrow streak varies in different specimens. Beyond the cell, there is a slender U-shaped white loop at the base of areas 2 and 3. Areas 1 a and 1 bear elongate white double streaks extending from the base. At the base of area 6 there is a large quadrate white spot and below it another broad elongate white streak. Beyond these, there are a number of scattered irregular white terminal and subterminal spots.

On the underside, the apex of the forewing and hind wing are olive brown,while the remaining basal portion of the forewing is dusky black. The spots and markings are very similar to those on the upperside. In the male, the underside of the hind wing bears a pendulous pouch. The head and thorax are black, spotted and streaked with white. The abdomen is dusky brown above and ochraceous below. The antenane are black.

Expanse : 90 - 100

Range : Throughout India, Burma and Ceylon and extending even to the Nicobars.

Habits : It is a large and one of the commonest species of butterflies inhabiting both the hills and the plains in India. Its flight is stronger than in most other species of Indian Danaids. It generally frequents scrub jungles and lightly forested land, but may be found everywhere in the open plains and even ascends hills up to considerable altitudes. The food plants are species of Calatropis (Asclepiadaceae).

The secondary sex character in this species is a pendulous pouch in the male,lined with specialised scent scales that serve to attract the female.

Description : ♂ ♀ : The upperside is very dark smoky brown, becoming gradually paler and lighter brown towards the margin. In both wings there is a more or less complete series of terminal and subterminal series of white spots, the former being larger and in the hind wing these are elongately oval and much larger than the terminal spots. In the forewing, the terminal spots are obsolete towards the apex and the subterminal spots decrease in seize towards the apex, where the series also curves inwards. The upperside of the hind wing in the male bears a prominent creamy white elongated patch of scent scales in and over the cell as in *E. Klugii*. Both the specimens in the collection, being males, bear this prominent white area in the hind wing.

The underside is paler brown.with the markings more or less similar to those on the upper side. On the underside of the forewing there are two to four additional discal spots. The antennae are blackish brown and the head, thorax and abdomen are dark brown,the head and thorax being spotted with white, above.

The specimens in the collection belong to the typical form, but the race *sinhala* Moore, is confined to Ceylon.

Expanse : 100 - 104 mm.

Range : Peninsular India, South of Bombay, along the Coasts. Eastward, it has been recorded from Bengal and Orissa.

Habits : Not much has been recorded about the habits of this species. It is a much less variable species than *E. klugii* which it closely resembles. However, it appears to be a rather uncommon species. At first sight it appears to be a larger edition of *Euploea coreta coreta*. It is mostly confined to the coastal areas in the regions from which it has been recorded.

Euploea mulciber (Cramer).

The Striped Blue Crow.

Plate XIII, fig. 7.

Specimens in the collection: One; its exact locality is not recorded; 90 mm.

Description : ♂ : The upperside of the forewing is dark brown, beautifully glossed with pale, bluish white spots on the terminal, marginal and discal areas. There is one spot near the end of the cell. The hind wing is ovate, uniformly dark brown and unspotted, except for a large, radiating patch of light brown scales over the upper third of the wing.

♀ : This is lighter brown, with the blue-glossed area in the forewing smaller and confined to the discal area. The spots are larger and pure white, but disposed more or less as in the forewing of the male. In addition, there is a streak in the cell and in the area beyond, and a terminal row of white spots. The underside in both the male and the female is similar to the upperside in the corresponding sex, but the markings are

broader and more sharply defined. The antennae, head, thorax and abdomen are dark brown,the head and thorax being spotted with white and the abdomen transversely banded with white beneath.

Expanse : 90 - 100 mm.

Range : The Himalayas, from Simla to Sikkim and Kulu to Assam; Nepal, Cachar, and extending to Burma, Siam and Malay Peninsula. Also from Madras to Bengal.

Habits : This is one of the most widely distributed species of this genus in the Indian area. Although it is common only in Bengal and Assam, its distribution extends down the Eastern Ghats up to Madras, where, however, it is very rare. It prefers warm valleys in the hilly regions and in Assam and Bengal it is found both in the hills and the plains. This is the only Indian species of *Euploea* in which the male and female are markedly different from each other.

Note : There are a number of American and Burmese specimens in the collection, belonging to the family Danaidae, but these are not included in the present account, the scope of which is limited mainly to forms met with in the Indian Region, particularly South India.

Family SATYRIDAE.

This family includes the somewhat dull-coloured, inconspicuous, brown or blackish brown butterflies popularly known as the Browns or Satyrids. In the oldler scheme of classification they were included in the subfamily Satyrinae under the family Nymphalidae, but they are now separated into a distinct family, the Satyridae.

The Satyrids are a group of somberly coloured butterflies with short, broad wings, marked above and below with ocelli or eye-like spots. Sometimes the wings bear transverse white or brownish bands. Some species have the underside of the wings beautifully ornamented with colour patterns. The forelegs are reduced and non-functional.

The Satyridae are shade-loving butterflies frequenting bushes,grasses and dense under-growth or thick evergreen jungles. They seldom come out into open places. A few hill species,however, like sunshine and freely come out into the open country. Their flight is weak and they frequenty drop low after flying a short distance. This results in a jerky flight, often close to the ground. Many species are protectively coloured on the under side. The larva food plants of all the species (except those of the genus *Elymnias* which feed on palms) are grasses, including bamboos. Many species display secondary sex characters in the males in the form of brands on the wings.

Genus **Mycalesis** Hübner.

This genus includes dull - coloured,moderate sized butterflies popularly known as the Bushbrowns. They are usually dark brown, with a conspicuous ocella or eye - like

spot on the upper side of the forewing. On the under side there is usually a pale submarginal band across both the wings and ocelli are found on the margin outside this band. In dry season forms, the ocelli are reduced to fine dots.

In the forewing the costa is more or less arched and the apex rounded or rather acute. The dorsum is straight in the males. The hind wing is ovate and the costa and the termen on the hind wing are more or less arched. The cell is short and about half the length of the wing in both the wings. The males have a sex brand on the upper side of the hind wing and a corresponding one on the underside of the forewing.

Most of the species of this genus inhabit hilly regions but they are found only at low altitudes. The habits are more or less the same as those described for the family Satyridae.

Nine species of *Mycalesis* are represented in the Museum collection, most of them being exclusively South Indian species. Further intensive collection of this group is needed to fill up the gaps in the series as a few South Indian species are still not represented in the collection.

Based mainly on the nature of the brands in the male, the species of this genus are separated into five groups by 'Wynter - Blyth [1],' but all the species in the collection, except two, (*Mycalesis patina* Moore and *Mycalesis anaxias* Hewitson), belong to Group 2 in which the brands are normal in the male, with no tuft or brand on the upper forewing and veins 3 and 4 in the hind wing originate from the same point or arise from a short stalk. *Mycalesis anaxias* belongs to group 1 in which there are usually no ocelli on the upper side of the hind wing and the male bears an elongated cavity along vein 1, which is covered by a tuft. *Mycalesis patina* belongs to Group 4 distinguished by the veins 3 and 4 being stalked well beyond the apex and by the absence of a brand on the under side of the forewing in the male.

Group I.

Mycalesis anaxias Hewitson.

The White - Bar Bush Brown.

Plate XIV, fig. 1.

Specimens in the collection : One, Coorg; 50 mm.

Description : ♂ ♀ : The upperside is dull brown. The upperside of the forewing bears an oblique white bar across the apical area. Ocelli are absent. In the male, the upperside of the hind wing bears a black sex brand with a pale yellow tuft. The underside of the forewing bears a small black brand. The brand and tuft on the upperside of the forewing are black.

The underside, in both sexes, bears a white - centred fulvous - ringed black ocellus in interspace 2 and two preapical smaller ocelli.

1. *Wynter - Blyth : Butterflies of the Indian Region, 1957, PP. 82-91*

In the dry season form, the ocelli on the underside are more translucent and the terminal and subterminal dark lines on both the wings are absent or faintly marked.

Expanse : 48 - 55 mm.

Range : Hills of South India; Nilgiris, Travancore, Coorg, Sikkim to Assam and Burma.

Habits : This is essentially a hill species confined to the evergreen forests. It keeps mostly to thick shade, being seldom found in open country. In the Nilgiris, it is found up to an altitude of 6000 feet.

Group II.

Mycalesis perseus typhlus Fruhstorfer.

The Common Bushbrown.

Plate XIV, figs, 2 & 3.

Specimens in the collection : Five, one of which is from Coorg; the locality of the remaining specimens is not recorded; 41.5 mm.

Description : ♂ ♀ : The upperside is brown. The forewing bears a white-centred and fulvous-ringed black ocellus in interspace 2 and occasionally a similar, but smaller one in interspace 5. The hind wing is uniformly brown, sometimes bearing two or three obscure ocelli. Pale subterminal and terminal lines are present on both the wings. On the underside the ground colour and pale lines are similar, but the wings are crossed by a common purplish white narrow discal line. The underside of the forewing bears two to four ocelli, and the hind wing seven ocelli of which the last three are in a straight line and the rest are strongly curved outwards.

♂ : The brand on the upperside of the hind wing and the under side of the forewing is black.

In the dry season form the transverse discal band on the underside are obscure and the ocelli, if present, are reduced to minute dots.

The antennae, head, thorax and abdomen are brown.

Expanse : 38 - 55 mm.

Range : The species, *Mycalesis perseus*, as a whole, has a wide range of distribution extending over Ceylon, South India to Bengal, Himalayas, Sikkim, Bhutan, Assam and Burma, but the race *typhlus* which alone is represented in the present collection, is confined to South India.

Habits : This is one of the commonest species of Bushbrowns inhabiting the wetter, well - wooded parts of the country wherever it has been recorded. It ascends the hills up

PLATE XIV

PLATE XIV

Fig. 1. *Mycalesis anaxias* Hewitson (natural size).

" 2. *Mycalesis typhlus* Fruhstorfer (dorsal view, (natural size).

" 3. *Mycalesis typhlus* Fruhstorfer (ventral view, natural size).

" 4. *Mycalesis mineus* polydecta Cramer (natural size).

" 5. *Mycalesis visala visala* Moore (natural size).

" 6. *Mycalesis subdita* Moore (dorsal view, natural size).

" 7. *Mycalesis subdita* Moore (ventral view, natural size).

" 8. *Mycalesis khasia ochra* Evans (dorsal view, natural size).

" 9. *Mycalesis khasia ochra* Evans (ventral view, natural size).

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to an altitide of 4000 to 5000 feet in South India and Ceylon; the males have been observed to frequent damp, sandy patches.

Mycalesis mineus polydecta Cramer.

The Dark Band Bushbrown.

Plate XIV, fig. 4

Specimens in the collection : Three, of which one is from South cochin and another from Coorg, the locality of the third specimen is not recorded. The specimen from Coorg is incomplete. 45.5 mm.

Description : ♂ ♀ : This species closely resembles the preceding one, but may be readily distinguished from it by the posterior five,and not three, ocelli on the under side of the hind wing being in a straight line.

The upperside of the forewing bears a single, white-centred, fulvous-ringed black ocellus located in a more or less pale area which is bordered on the inside and outside by a narrow dark line. The ocellus is generally encircled by a dark yellow ring which merges into the pale area.

On the underside, the ground colour is similar, and both wings are traversed by a dusky white discal band. The ocelli on the underside of the hind wing differ from those of the preceding species as stated above. Beyond the rows of ocelli on both the wings there are pale purplish white terminal and subterminal lines. In the male, the sex brand on the upperside of the hind wing is salmon pink and that on the underside of the forewing small and brown.

In the dry season form, the ocelli are reduced to minute dots and the pale area surrounding the ocellus on the upperside of the forewing is very extensive.

This species is subject to considerable variation.

Expanse : 40 - 50 mm.

Range : The species *Mycalesis mineus* as a whole, ranges in its distribution over Ceylon, Peninsular India, south of Bombay, Madhya Pradesh, Bengal, the Himalayas from Kulu to Sikkim and eastwards to Assam and Burma. The race *polydecta* which alone is represented in the collection, is the Southern form, confined to South India.

Habits : This species is common, found usually at low elevations in the hills and on the plains. Occasionally it ascends the hills up to an altitude of 6000 feet.

Mycalesis visala visala Moore.

The Long Brand Bushbrown.

Plate XIV, fig. 5.

Specimens in the collection: Two, Coorg; 50 mm.

Description : ♂ ♀ : This species closely resembles *M. mineus* in colour, markings and general appearance, but is on the whole somewhat larger. The forewing is, as a rule, more pointed and acute at apex and the termen not so rounded, but rather straight. This distinction is more marked in the dry season form. In the wet season form, the apex and the termen are both a little more rounded. The ocellus on the upperside of the forewing is large and prominent, white-centred and with a buff outer ring. In the male, the sex brand on the underside of the forewing is very long and bright yellowish brown.

This species is subject to considerable variation.

Expanse : 45 - 55 mm.

Range : The species M. visala Moore, has a wide distribution, ranging over Sikkim, Bhutan, Pachmarhi, Bengal, Simla Hills, and eastwards to Assam, Naga Hills and Burma, and South India. The race visala, which alone is represented in the collection, is the South Indian form.

Habits : This species is very variable. It is very common in certain parts of its range especially in the Sikkim area and around Calcutta. In the Naga Hills, it is recorded between altitudes of 2000 and 5000 feet. The race visala is confined to South India.

Mycalesis subdita Moore.

The Tamil Bushbrown.

Plate XIV, figs. 6 & 7.

Specimens in the collection : Three, Madras; 45.5 mm.

Description : ♂ ♀ : This species is very similar in colour, markings and general appearance to *M. mineus*, in both its wet and dry season forms. The upperside of the wings bear a pale submarginal line with two black lines between it and the margin. The ocellus on the upperside of the forewing has a white, dot - like centre and a well defined yellowish brown ring. The underside of the wings is very dark in the wet season form.

The male may be distinguished by the sex brand on the underside of the forewing being much longer and broader than in *M. mineus*, but not extending beyond the discal band traversing the wings. The brand on the upperside of the hind wing is pale yellow.

Expanse : 43 - 50 mm.

Range : Ceylon, South India, Nilgiris, Travancore, Madras to Orissa and Bangalore.

Habits : This species is common at low elevations in the jungles of South India ascending to an altitude of about 3000 feet in the hills. These butterflies are readily attracted by sugar.

Mycalesis khasia orcha Evans.

The Pale - Brand Bushbrown.

Plate XIV.figs. 8 & 9.

Specimens in the collection : Two, one from South coorg and the other from the Pulneys; 46 mm.

Description : ♂ ♀ : This species is very similar to the preceding species in colour and general appearance. The apex of the forewing is pointed. On the upperside of the wings, the margin is white, followed closely by a black line and a pale submarginal band which is rather obscure especially in the forewing. The pale discal band is prominent and the ocellus outside this on the forewing is reduced to a small black dot surrounded by a pale brownish ring.

On the underside, the discal band is white and broad, usually slightly bent inside ocellus in area 2 on the forewing.

In the male, the sex brand on the underside of the forewing is larger than in the preceding species,reaching up to the discal band. The brand on the upperside of the hind wing is pale yellow.

In the wet season form, the wings are much paler in colour.

Expanse : 42 - 55 mm.

Range : South India, Pulneys, Shevroys, Nilgiris, Wynaad, Coorg, Assam and Burma.

Habits : This Species is not recorded in *Bingham's* volume on Butterflies in the Fauna of British India series, nor by Antram in his book on Butterflies of India. It is a common species inhabiting the jungles in the Nilgiris and northwards. It is similar in its habits to the preceding species.

Mycalesis adolphei (Guerin).

The Red - eye Bushbrown.

Plate XV. fig. 1.

Specimens in the collection : One, Western Ghats; 52 mm.

Description : ♂ ♀ : The upperside is chocolate brown. The forewing bears a large, white-centred,black ocellus about the middle, with a fulvous or reddish brown ring and a much smaller black, white - centred pre - apical spot above the large ocellus.

In the hind wing, there are two to four white - centred,black ocelli with reddish brown rings. These are smaller than the large, posterior ocellus in the forewing, the anteriormost being the smallest.

On the underside, the ground colour is similar, but marked with obscure transverse striae of darker brown. The terminal margins of both the wings are paler and separated from the darker central area by a well defined very dark brown line; there are two ocelli on the forewing and seven on the hind wing, arranged in a curve.

In the male, there is no sex brand on the underside of the forewing, but that on the upperside of the hindwing is black.

Expanse : 53 - 58 mm.

Range : South India, Nilgiris, Coorg, Anamalai Hills, Western Ghats.

Habits : This is a fairly common species of Bushbrowns inhabiting the hills between altitudes of 4000 and 7000 feet. It is most commonly seen during and after the monsoon up to the month of December. It frequents the edges of hill streams.

Mycalesis oculus Marshall.

The red - disc Bushbrown.

Plate XV, figs. 2 & 3.

Specimens in the collection : Two, one of which is from the Pulneys; the locality of the other specimen is not recorded; 55 mm.

Description : ♂ ♀ : This species resembles the preceding species in the ground colour of the wings, but attains a slightly larger size, and may at once be distinguished from all other species of *Mycalesis* enumerated above,by the presence (on the upperside of the forewing) of a very large, prominent, white - centred black ocellus placed on a broad, deep yellowish orange area which is broader anteriorly and is produced upwards towards the costa. The small pre - apical ocellus is small, inconspicuous and somewhat engulfed by the yellowish orange area of the bigger ocellus. On the upperside of the hind wing there are two to four, rather obscure black, white - centred ocelli encircled by a light brown ring. In the present specimens there are three such ocelli on the hind wing, of which the middle one is relatively the largest. The margin of the hind wing is slightly produced into a slight projection about the middle.

The underside is dark yellowish red or brown, with the dark basal protion of both the wings sharply defined by a yellowish band, the outer edge of which is rather diffuse. The ocelli on the underside are proportionately larger than, but otherwise similar to,those in the preceding species.

In the male, the sex brand is small, black and inconspicuous on the underside of the forewing and furnished with a small brown tuft on the upperside of the hind wing.

PLATE XV

PLATE XV

Fig. 1. *Myealesis adolphei* Guerin (natural size).

" 2. *Mycalesis oculus* Marshall (dorsal view, natural size).

" 3. *Mycalesis oculus* Marshall (ventral view, natural size).

" 4. *Mycalesis patnia junonia* Butler (natural size).

" 5. *Lethe europa ragalva* Fruhstorfer (dorsal view, x $^3/_4$).

" 6. *Lethe europa ragalvca* Fruhstorfer (ventral view, x $^3/_4$).

" 7. *Lethe drypetis todara* Moore (dorsal view, natural size).

" 8. *Lethe drypetis todara* Moore (ventral view, natural size).

PLATE XV

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Expanse: 54 - 60 mm.

Range : South India; Nilgiris and in the hills southwards; Cochin, Travancore and Pulneys.

Habits : This is one of the most prettily ornamented species of *Mycalesis* and is common in the hills to the South of the Nilgiris at fairly high elevations. They are generally found in well-wooded areas in the hills above an altitude of 3000 feet.

Group IV.

Mycalesis patnia Moore.

The Glad Eye Bushbrown.

Description : ♂ ♀ : This species is readily distinguished from all other species of *Mycalesis* recorded above by the large eye - like ocellus in area 2 on the upperside of the forewing. This black, white - centred ocellus is placed on the lower and outer edge of a circular white or yellow area. The wings are convexly rounded in outline. The underside is deep yellowish brown and variegated. Both wings on the underside are traversed near the base by a yellowish line, beyond which is a silvery discal band. Outside this there are two ocelli in the forewing encircled by a silvery ring, and on the hind wing there is a curved series of seven ocelli bordered on both sides by a silvery band.

Two races of this species namely *patnia* and *junonia* are recorded. Of these, *patnia* is confined to Ceylon and *junonia* to South India. The latter alone is represented in the collection by a single specimen. It is distinguished from *patnia* by the patch around the forewing ocellus being white instead of yellow (as in *patnia).*

Mycalesis patnia junonia Butler.

The South Indian Glad Eye Bushbrown.

Plate XV, fig. 4.

Specimens in the collection : One, Pulneys; 46 mm.

Description : ♂ ♀ : This race shows the typical characters of the species as outlined above, except that the upperside is of a duller brown colour, and slightly tinged with yellow. The patch encircling the median ocellus on the forewing is pure white. A smaller sub - apical ocellus is also present. A yellow discal patch is absent or represented by faint traces. The hind wing is uniform, with two small, yellow-ringed black ocelli.

The underside is altogether duller than in the Ceylon race; it is brownish yellow with fine black terminal lines as on the upper side. The median ocellus on the forewing is broadly encircled with white.

The male bears a large bright yellow spot on the hind wing near the tornus. The sex brand on the upper side of the hind wing is black with pale brown tuft. The brand is absent on the underside of the forewing.

The female is more yellow on the upperside and without ocelli on the hind wing. The underside is as in the male, but brighter yellow and the basal area of both the fore and hind wings is traversed by two darker yellow bands.

Expanse: 44 - 52 mm.

Range : Hills of Southern India; Nilgiris, Mysore and North Canara.

Habits : This is a common South Indian species, frequenting well - wooded country and shady groves. They occur generally in swarms and are attracted to fallen fruit, sugar and toddy. They are found in the Nilgiris up to an altitude of 6000 feet in evergreen forests. They are also partial to bamboo vegetation.

Genus **Lethe** Hübner.

This large genus comprises numerous species, popularly known as the Treebrowns. They are usually dull brown on the upperside, often with a white band on the forewing in the females. The underside of the hind wing is always ocellated and often richly variegated. The forewing is triangular, generally short and pointed and the hind wing ovate and often caudate. The termen in the forewing is straight and concave whereas in the hind wing it is strongly arched, scalloped and often caudate or dentate at the termination of vein 4.

Species of this genus inhabit mostly bamboo jungles as the food plants of almost all the species consist of bamboos. They are active mostly in the mornings and evenings and rest during the greater part of the day. Their flight is weak, and although rapid, it is unsteady, the insects frequently settling in some sheltered spot among the undergrowth, during their flight.

This genus includes a large number of species most of which are confined to the Himalayas, Assam, Sikkim, Bhutan and Burma. Only three species are recorded from South India and one exclusively from Ceylon. Of the three species known from South India, one is rather rare in South India, although more commonly seen in North India. All these three species are represented in the Museum collection.

Lethe europa ragalva Fruhstorfer.

The Bamboo Treebrown.

Plate XV, figs. 5 & 6.

Specimens in the collection : Four, of which one is from Coorg and another from Malabar; 66.5 mm. The Locality of the other two specimens is not recorded.

Description : ♂ : The upperside is dark brown. On the forewing, there ae two inconspicuous black ocelli followed by two distinct white spots. the upper one of these being double. The white discal bar of the underside shows through conspicuously. The terminal margins of both the wings bear pale white lines. The underside is very dark, almost blackish brown, traversed near the base by a slender bluish white line. On the underside of the forewing is an oblique white discal bar and the undersides of both wings bear a post-discal series of black ocelli bordered by silvery purple lines on both sides. This series of ocelli on the forewing is curved inwards and on the hind wing they are curved outwards. There is a terminal yellowish band, margined internally by a silvery purple line.

♀ : This is similar to the male, but the upperside of the forewing bears a broad, white, oblique discal band and the hind wing bears an incomplete post-discal series of black spots. The underside is similar to that of the male, except that the markings are larger.

Expanse : 65 - 75 mm.

Range : This species (i.e. *Lethe europa* Fabricius)is common in North India but rather rare in South India. In North India its distribution ranges over the whole of North Indian plains, Madhya Pradesh, lower hills of the Himalayas, Assam and Burma and extending as far as Malay Peninsula and China. The present race *ragalva* Fruhstorfer, is the South Indian race. The margin of the hind wing is distinctly crenulated and the termen is produced into a short, blunt, tail-like projection postero-laterally.

Habits : This species is found at low elevations in bamboo vegetation. It is common in the foothills of the Himalayas especially in Assam and N.E. India. In South India it is somewhat rare, being most usually seen during the monsoon in the Nilgiris. Its flight is strong, being usually around bamboo clumps, but it is occasionally found flying high among the tree tops.

Lethe drypetis todara Moore.

The Tamil Tree brown.

Plate XV, figs. 7 & 8.

Specimens in the collection : Three, Coorg, Pulneys and Nilgiris 56.5 mm. This is about 9 mm. less than the minimum recorded expanse for this species.

Description : ♂ : The upperside is very dark brown. The forewing is uniform. The hind wing bears a post-discal series of three or four black ocellar spots in the typical form, but these are wanting in the specimens in the collection. The underside is brown, with a broad band across the cell and its apical and medial portions are suffused with lilac. A post-discal series of five ocelli are present. The series is curved inwardly. There is a terminal yellowish and subterminal lilac-coloured line. In the hind wing there are narrow basal and discal bands of lilac and a post-discal series of ocelli. The terminal lines are as on the forewing.

♀ : This is similar to the above, but paler, with a broad, oblique white discal bar and two white pre-apical spots on the upperside of the forewing. The markings on the underside are relatively more sharply defined than in the male.

Expanse : 65 - 70 mm.

Range : Southern India. The present race. *todara*, of which specimens are represented in the Museum collection, is the typical South Indian race, confined to South India, but the distribution of the species as a whole is known to range over South India and Ceylon.

Habits : This species is very common in the low wooded regions of the Western Ghas and the Nilgiris. Its larvae feed mostly on bamboos, but they also seem to feed on grasses at altitudes above 7000 feet in the Western Ghats. Its habits are more or less the same as those of the preceding species. The egg is laid singly on the underside of a leaf. The larvae hatch out and are usually found on leaves close to the ground in shady situations. The larvae are mostly found on the thorny species of the bamboo, *Bambusa arundinaceae.*

Lethe rohria Fabricius.

The Common Treebrown.

Description : ♂ : This species is very similar to the preceding one. On the upperside of the forewing a costal and two pre-apical white spots are present. In the hind wing the ocelli of the underside show through, often forming somewhat faint, diffuse, black spots; two fine subterminal black lines are also present on the upperside of the forewing.

On the underside of the forewing, a broad discal and a narrower discal band arranged in the form of a V are present. On the underside of the hind wing there is a basal whitish line beyond which there is a series of six double-ringed black ocelli arranged in the form of a curve and bordered on both sides by lilac-white lines. Two fine terminal lines are also present as on the forewing.

♀ : The upperside bears a broad white discal band on the forewing and a white spot below it, but the underside is as in the male.

The antennae and the head, thorax and abdomen are brown.

Range : The distribution of this species extends over Kashmir to Kumaon, Sikkim, Assam and Burma, and South India and Ceylon. This species includes three races, of which only the southern race, *nilgiriensis* Guerin (inhabiting Ceylon and South India) is represented, in the collection.

Lethe rohria nilgiriensis Guerin.

The Southern Common Treebrown.

Plate XVI, fig.1.

Specimens in the collection : Eight; of these, two are from Pulneys, two from Coorg and the rest are from localities not specifically recorded. Three specimens are in a bad state of preservation; 58.5 mm.

Description : ♂ : This bears the same costal and pre-apical spots on the upperside of the forewings as in the other two races, but in this race, they are larger and there is an additional white spot placed in area 2 near the termen.

♀ : This differs from the male of the typical form in having the discal white band on the upperside of the forewing divided into three distinct white spots, the middle of these spots being in area 3. This band is narrower on the underside of the wing. On account of this difference in disposition of spots the males in this race may be easily distinguished from the females.

Expanse : 58 - 70 mm., but the southern race, *nilgiriensis* averages around 64-66 mm.

Range : Ceylon, Central and Southern India, northwards up to South Bihar, Jubbalpore and Konkan.

Habits: The larvae of this species feed on grasses. These butterflies inhabit lightly wooded or open country and are much less strictly confined to the jungle than the other species of this genus. Their flight is weak. This is normally a hill species, but in Malabar, it is found in the plains.

Genus **Ypthima** Hübner.

The Rings.

This genus includes small, brownish butterflies popularly known as the Rings, on account of the prominent ringed ocellus on their forewings.

♂ ♀ : The forewing is triangular, with a widely arched costa, straight termen and rounded tornus. A prominent, double-pupillated ocellus with a yellow ring, is present on the forewing below the apex, and one or more smaller ocelli on the upperside of the hind wing. The underside of the hind wing also bears conspicuous ocelli on the outer half of the discal area.

The hind wing is ovate, with the costa and termen arched, but the dorsum is straight. The underside of both the wings are paler brown and decorated with fine striations and faintly marked bands.

Male secondary sex mark is usually present in the form of a large patch of specialized scales on the upperside of the forewing. Most species have a dry season form in which the ocelli are reduced to mere specks.

This genus comprises a large number of species many of which are confined to the Himalayas, Assam and Burma, but some species are South Indian and many occur more or less all over India where there is plenty of grass. Most of them inhabit open country, but some prefer well wooded areas and shady places. They have a jerky flight and frequently settle on the ground or on bushes with their wings partly closed.

Eight species, most of them purely South Indian in distribution, are represented in the collection, but many of the specimens are unfortunately in a rather poor state of preservation owing to the delicate nature of their wings.

Ypthima asterope mahratha Moore.

The Common Threering.

Plate XVI, fig. 2.

Specimens in the collection : One, with the wings on the left side in a rather mutilated conditon; its locality is not recorded; 32 mm.

Description : ♂ ♀ : The upperside is dull brown, with a whitish fringe. The forewing bears a white-centred black sub-apical ocellus ringed with yellowish brown. A pale ocellar area is present in most specimens. The hind wing is uniform with a single small sub-tornal ocellus.

The underside is greyish white with very fine transverse striations. On the underside of the forewing a discal and subterminal dark brown bands are present, meeting below the ocellus to form a loop. On the underside of the hind wing there are three small ocelli-a pre-apical, a sub-tornal and a tornal. The antennae, head, thorax and abdomen are dull brown.

In the dry season form, the ground colour is paler and the ocelli on the underside are reduced to minute specks or absent altogether.

Expanse : 30 - 37 mm.

Range : N.W. Himalayas, Baluchistan, Burma and all over India. This is a widely distributed species extending eastwards as far as China.

Habits : This is common species found abundantly all over India at all seasons in the open plains and also in forested country. It is essentially a plains species, never ascending to any appreciable heights in the hills either in the Himalayas or in the hills of South India.

PLATE XVI

PLATE XVI

Fig. 1. *Lethe rohria nilgiriensis* Guerin (x $^3/_4$).

" 2. *Ypthima asterope mahratta* Moore (natural size).

" 3. *Ypthima ypthimides* Moore (natural size).

" 4. *Ypthima chenui* Guerin - Meneville (natural size).

" 5. *Ypthima ceylonica* Hewitson (x 1 ¼).

" 6. *Ypthima hubneri hubneri* Kirby (x 1 ¼).

" 7. *Ypthima avanta singala* Felder (natural size).

" 8. *Ypthima philomela tabella* Marshall & De Niceville (natural size).

" 9. *Ypthima baldus madrasa* Evans (natural size).

" 10. *Zipoetis saitis* Hewitson (x $^3/_4$).

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Ypthima ypthimoides Moore.

The Pulney Fourring.

Plate XVI, fig. 3.

Specimens in the collection : Two, Pulney Hills, South India. Of these only one is complete, the left hind wing having been lost in the other specimen; 42.5 mm.

Description : ♂ ♀ : This species closely resembles the preceding one, but may be distinguished from it by the upperside being darker. The underside is brown or brownish white, without the short transverse striae. The terminal and subterminal lines are absent in the forewing and only faintly indicated on the hind wing.

The female is paler than the male and has the underside of the hind wing crossed by a narrow, grey-white band. The yellow ring round the doble-pupillated ocellus is clearer in the female than in the male.

The antennae, head, thorax and abdomen are brown.

Expanse: 40 - 45 mm.

Range : Hills of South India, south of the Nilgiris. Common in the hills in the extreme south of India in Trivancore and Cochin.

Habits : The species resembles the preceding species in its habits. It is confined to the higher elevations in the hills of the extreme south of the Peninsula. It generally frequents hill ranges above an altitude of 3000 feet and is common at all seasons of the year.

Ypthima chenui Guerin - Meneville.

The Nilgiri Fourring.

Plate XVI, fig. 4.

Specimens in the collection : Two, Pulneys, South India; 36.5 mm. The larger specimen is 2 mm, larger than the maximum recorded expanse (i.e. 48 mm.).

Description : ♂ ♀ : The upperside is pale brown or vandyke brown with a large, pre-apical, double-pupillated black ocellus encircled by a yellow ring. A faint, subterminal transverse band is present. The upperside of the hind wing bears two small, yellow-ringed unpupillated ocelli. The underside is greyish brown ornamented with short brown streaks and dark brown transverse bands. The underside of the forewing bears a single large ocellus as on the upperside while that of the hind wing bears an apical and three posterior small ocelli arranged in a curve. The antennae, head, thorax and addomen are dull greyish brown.

In the dry season from, the ocelli on the underside are smaller.

Expanse: 36 - 46 mm.

Range : South India, Nilgiris, Pulneys and Coorg hills.

Habits : This species is common in South Indian hills, being most usually found in the Nilgiris and in the hills of Coorg, generally between elevations of 4000 to 6000 feet. In Travancore, it has been seen at low elevations.

Ypthima ceylonica Hewitson.

The White Fourring.

Plate XVI, fig. 5.

Speciments in the collection :. Two; their locality is not recorded; 32 mm.

Description : ♂ ♀ : On the upperside, the forewing is brown, varying in shade from a light brown to deep sepia brown. The forewing is uniform, with a large, yellow-ringed, double-pupillated black ocellus. On the upperside of the forewing, the posterior half is pure white, while the anterior half is of the same brown colour as the forewing. In the posterior white area, near the margin, are arranged two or three small ocelli posteriorly. Subterminal and terminal slender black lines are present beyond the series of ocelli. The underside is white, with fine brown transverse striae which are more numerous on the forewing and get denser towards its apex. The ocellus is somewhat oval-shaped, being broadly produced downwards, and encircled by a broad, yellowish brown ring. The underside of the hind wing bears four small ocelli arranged in a curve, the anteriormost being separated by a wide gap from the remaining three. The antennae, head, thorax and abdomen are brown.

Expanse : 30 - 35 mm.

Range : Parts of South Bengal, Orissa, South India, the Nilgiris, Travancore and Ceylon.

Habits : This species was originally known from Ceylon only, but later it has been met with in Bengal, Orissa and parts of South India also. It is found almost throughout the year up to an elevation of 3000 feet in the hills and in the plains, in thickly wooded country where it may be generally seen hovering about among bushes close to the ground. It is locally abundant in certain parts of the hills, while it is practically unknown in certain other parts.

Ypthima hubneri hubneri Kirby.

The Common Fourring.

Plate XVI, fig 6.

Specimens in the collection : Four; of these two are from the Nilgiris, one is from Cochin and one from Trivandrum. The specimen from Trivandrum and one of the

specimens from the Nilgiris are badly mutilated, some of the wings having been lost; 31 mm.

Description : ♂ ♀ : The upperside is pale brown, the forewing bears the usual large, bi-pupillated, yellow-ringed black ocellus. The hind wing bears two or three small black ocelli near the margin posteriorly. The underside is greyish white ornamented with rather widely spaced transverse brown streaks. The underside of the forewing bears the large, single pre-apical ocellus as on the upperside and the underside of the hind wing bears one apical and three closely set posterior ocelli, arranged in a curve. Both the wings are traversed by dark brown transverse bands. The above description applies to the wet season form, to which the specimens in the collection belong.

In the dry season form, the wings are paler both on the upper and undersides, and the ocelli on the underside of the hind wing are reduced or absent.

The antennae, head, thorax and abdomen are greyish brown.

Expanse : 30 - 40 mm.

Range : The distribution of the species ranges over the Himalayas, peninsular India, Assam and Burma. Several geographical races are recorded. The southern race *ceylonica* Hewitson is distributed over South India and Ceylon; the race *hubneri* Kirby to which the present specimens have been assigned, appears to be synonymous with *ceylonica*. The race *kashmira* occurs in the North West Himalayas and Kashmir.

Habits : This is a very common species of *Ypthima* found in fairly large numbers both in the open hills and in forested country. In the hills of Southern India, especially in the Nilgiris and in Travancore, this species occurs commonly at altitudes of 4000 to 5000 fet almost throughout the year, but as mentioned above, the wet season forms differ from the dry season forms in being paler brown.

Ypthima avanta singala Felder.

The Jewel Fourring.

Plate XVI, fig. 7.

Specimens in the collection : One, Pulneys. The specimen is incomplete, with the left forewing missing; 36 mm.

Description : ♂ ♀ : The upper side is dark brown, with faint subterminal dark bands. The forewing bears a yellow-ringed double-spotted black ocellus just below the apical area; in the male, this may be faint or absent. The hind wing bears two small black post -discal ocelli.

The underside is brownish white with close-set fine, dark brown striae. The underside of the fore wing bears a single ocellus and the hind wing six ocelli arranged in a curve.

The male may be with or without a sex brand.

The present race, *singala* Felder, is distinguished from the typical form by the upper side being slightly darker, with a purplish tinge. On the underside, the ground colour is whiter than in the typical form.

Expanse : 30 - 45 mm.

Range : Ceylon; Peninsular India up to Madhya Pradesh; Himalayas from Kashmir to Assam. This is the range of the species as a whole. The present race, *singala* Felder, is confined to South India and Ceylon.

Habits : The habits generally resemble those of the preceeding species. It ascends the hills up to 4500 feet in the N.W. Himalayas during summer and to higher elevations in the Eastern Himalayas. In the South, the South Indian race Singala is confined to the hills of Ceylon and South India.

Ypthima philomela tabella Marshall and de Niceville.

The Baby Fivering.

Plate XVI, fig. 8.

Specimens in the collection : One; its exact locality has not been recorded; 34 mm.

Description : ♂ ♀ : The upperside is brown, with the terminal margins of the wings darker. The forewing bears a large, oval, slightly oblique, bi-pupillated, yellow-ringed black ocellus. The other ocelli are disposed as in *Y. baldus*, but the minute tornal ocellus on the hind wing is absent.

The underside is similar to the underside in *Y. baldus* but darker, being ochraceous white, ornamented with close-set transverse brown striae. On the underside of the forewing the yellow ring round the ocellus is broader and encircled by another faintly marked brown ring. The underside of the hind wing bears six small, blind ocelli arranged in pairs as in the next species, *Y. baldus*. Subterminal obscure brown bands are present on the underside of both the wings. The antennae, head, thorax and abdomen are brown, paler on the underside. This species is on the whole smaller in size than the next one. In the male, the sex brand is absent.

The dry season form is paler and the ocelli on the underside of the hind wing are reduced to minute dots.

Expanse : 32 - 35 mm. Wynter Blyth quotes the expanse as 23 - 25 mm., but the specimen in the collection measures nearly 32 mm. across and is nearly as large as those of *Y. baldus* in the collection.

Range : South India, Nilgiris and Wynaad; North Burma.

Habits : This species is rather restricted in its distribution being confined, in South India, to the jungle tract north of the Nilgiris, between Nilgiris and Wynaad. It is locally common and may be often seen on the grassy slopes of the hills at elevations of about 3500 feet.

Ypthima baldus madrasa Evans.

The Common Fivering.

Plate XVI, fig. 9.

Specimens in the collection : Five; of these one is from Coorg and one from Pulneys; the locality of the remaining three specimens is not recorded; 36 mm.

Description : ♂ : The upperside is brown, with the terminal margin much darker on both the fore and hind wings. The forewing bears a double-pupillated, yellow-ringed, black ocellus. The hind wing bears two smaller, single-pupillated ocelli. Sometimes one or two minute tornal ocelli are also present.

The underside is brownish white, ornamented with close-set transverse brown striae. The forewing has the large ocellus as on the upperside, but the hind wing bears six smaller ocelli arranged in three pairs. There are also distinct subterminal, discal and sub-basal transverse brown bands on both the wings on the underside. There is a prominent sex brand.

♀ : This is distinguished from the male in having the area surrounding the ocellus on he upperside in both the fore and hind wings being paler. On the underside also the ground colour is paler than in the male and the transverse brown bands are more sharply defined.

In the dry season form, which is paler, the ocelli on the underside of the hind wing are reduced and appear as dots. The present specimens, however, all belong to the typical wet season form.

The antennae, head, thorax and abdomen are dull brown.

In one of the specimens in the collection, the ocelli of the underside of the hind wing are arranged in two groups, an anterior group of two of which one is minute and contiguous with the main one, and a posterior group of three in which the middle one is larger and the other two are minute. This disposition is rather peculiar and is worth recording. Probably this specimen is intermediate between the wet and dry season forms.

Expanse : 32 - 48 mm.

Range : The Himalayas, from Chamba, through Sikkim and Bhutan to Assam, Bengal and Burma. Also Central, Western and Southern India.

Habits : This is a very common and widely distributed species of butterfly found all over India from the Himalayas to Southern India. It is extremely common in South India, being found in all seasons of the year both in the plains and in the hills up to an altitude of about 7000 feet. It inhabits both open country and well wooded regions, and various intermediate stages between the wet and dry season forms have been collected.

Genus **Zipoetis** Hewitson.

This genus includes the butterflies known popularly as the Catseyes.

♂ ♀: The wings are very wide and the costa in the forewing is widely arched. The apex of the forewing is broadly rounded, its termen being rounded and the dorsum straight. The cell is broad, about half the length of the wing.

The hind wing is broadly pear-shaped, with the termen somewhat scallopped, being distinctly angulated at the terminations of veins 2, 3, 4, and 6. The cell is broad and long, well over half the length of the wing.

The antennae are slender, rather short, with the club gradually enlarged.

Only a single species is recorded from South India and this is represented in the collection. The other species are known only from Assam and Burma.

Zipoetis saitis Hewitson.

The Tamil Catseye.

Plate XVI, fig. 10.

Specimens in the collection: Three; of these one is from Cochin and another from Travancore. The locality of the third specimen is not recorded; 58 mm. The smallest specimen which measures 56 mm. is 4 mm. smaller than the minimum recorded expanse.

Description: ♂ ♀ : The upperside is velvety black, in fresh specimens, but in the present specimens it is faded to a dull purplish brown. The forewing bears a broad, oblique pure white band from the middle of the costa to nearly the margin on the termen in area 1. The hind wing bears a similar broad white band extending almost parallel to the posterior portion of the terminal margin. The outer margin of this band is concavely excavated between the veins.

The underside is similar, but paler. The white bands are as on the upperside. There is a subterminal wavy line on both the fore and hind wings on the underside. The underside of the forewing is without ocelli, but the underside of the hind wing bears a row of five large and prominent ocelli, enclosed within the range of the white band. the ocelli are brown, white-centred and encircled by blackish brown. The pre-apical ocellus is the largest and double-pupillated.

The head, thorax and abdomen are dark brown and the antennae reddish brown.

Expanse: 60 - 65 mm.

Range: Western and Southern India: Nilgiris, Anamalais, Cochin and Travancore.

Habits: This butterfly frequents densely wooded tracts in the hills of the Nilgiris and Western Ghats between 1000 and 3000 feet. Its flight is weak and seldom does it come out into the open. It is locally common. but is rarely seen on account of its habit of taking shelter in the thick vegetation of the hill slopes.

Genus **Orsotrioena** Wallengren.

This genus includes only a single Indian species, comprising the butterflies popularly known as the Niggers.

♂ ♀: The forewing is broadly triangular, with a broadly arched costa and more or less obtusely rounded apex. The termen and dorsum are nearly straight. The hind wing is broadly ovate, with the costa and termen slightly arched and the dorsum almost straight. The abdomen is thin and slender.

The male is distinguished by a sex mark consisting of a tuft of long hairs on the forewing and two such tufts on the hind wing covering an area of specialised scales.

Only one species is recorded in India and this is represented in the collection.

Orsotrioena medus mandata Moore.

The Nigger.

Plate XVII, fig. 1.

Specimens in the collection: One, Pulneys; 45 mm.

Description: ♂ ♀ : The upperside of both the wings is uniformly dark brown, but there are two very narrow pale lines immediately within the termen in the hind wing. The discal pale band shows through from the underside. In the forewing there is only a single terminal slender white line.

The underside is dark brown,with terminal and subterminal slender white lines on both the wings and a pure white narrow discal band stretching across both the fore and hind wings. Between this band and the terminal margin there are two ocelli on the forewing and three on the hind wing, the apical ocellus on the hind wing being much smaller than the others. The ocelli are encircled by a yellow ring and outside this by a brown ring, and finally outermost by a purplish ring which is common to the two apical ocelli in the hind wing. The present specimen belongs to the wet season form in which the markings and ocelli on the underside are distinct.

In the dry season form these are indistinct, and the underside may be almost unmarked.

This species resembles a *Mycalesis* in external appearance but may be distinguished from it by the unmarked upper surface and the arrangement of the ocelli on the underside. In the present race, *mandata* Moore, the discal band on the underside is broader and proportionately more narrowed towards the apex than in the typical form.

Expanse: 45 - 55 mm.

Range: The distribution of the species *O. medus* extends throughout Ceylon, South India, Central India and the Himalayas from Sikkim to Assam and Burma, but the race *mandata* Moore, which alone is represented in the collection, is confined to Southern India and Ceylon.

Habits: Its flight is very weak and unsteady. It may often be found fluttering close to the ground in places where there is heavy shade. It generally frequents the slopes of hills at low elevations, but is said to ascend as high as 4000 feet in the hills of Ceylon.

Genus **Melanitis** Fabricius.

This genus includes the butterflies popularly known as the Evening Browns.

♂ ♀ : The forewing is short and broadly triangular with a strongly arched costa and an obtuse apex. The termen is falcated above, and below this it is almost straight, with a slightly undulated margin. The dorsum is straight and the cell rather long, being more than half the length of the wing. The hind wing is irregularly ovate, with the costa broadly arched. The termen is straight up to vein 4. Below this it is sharply produced into a short, tail-like projection. The terminal margin is scalloped. The dorsum is straight, and the cell short, being less than half the length of the wing. The antennae are slender, with a gradually enlarged club.

There is much seasonal variation, especially in the markings on the underside of the wings, and, in addition to this, there is considerable individual variation.

This genus includes dull-coloured, dark brown butterflies with large, leaf-like wings. They are active only in the evenings and hence the popular name, Evening Browns.

Only three or four Indian species are known. Of these, two are represented in the Museum collection.

Melanitis leda ismene Cramer.

The Common Evening Brown.

Plate XVII, fig. 2.

Specimens in the collection : Fourteen, some of them differing remarkably among themselves in the markings on the underside. Both wet and dry season forms are

represented. The localities of most of the specimens are not recorded, but a few are from the Nilgiris, Pulneys, Bangalore and Madras; 70 mm. There are also two dry-preserved, blown larvae in the collection.

Description: Wet *season form:* ♂ ♀ : The upperside is dull brown, with two large, confluent black spots below the apex on the fore wing, both the spots having a white, pupil-like centre. The termen in the forewing is produced and angulated below vein 5 in the male, but more prominently produced and angulated in the female. The hind wing bears a smaller, dark, white-centred, black, subterminal ocellus with a fulvous brown ring. Other ocelli are reduced to minute dots. The apical ocellus and other ocelli on the underside sometimes show through. The terminal margin of the hind wing is produced into short, equal, tail-like projections at the ends of veins 1 and 3.

The underside is paler, grey-brown, densely traversed by fine, dark brown striae. A discal and a post-discal narrow dark brown bands are present. Beyond this, there is a series of four ocelli, rather minute. On the underside of the hind wing, there are six ocelli, the apical and subtornal being the largest and the others much smaller.

Dry season form : ♂ ♀ : This form is distinguished from the wet season form by the upperside being of a richer brown colour and by the large black ocelli on the forewing having a sharply defined, short, dark yellow bar above them, and a narrow curved band of the same colour bordering their inner edge. The termen of the forewing is produced and angulated at vein 5 in the male and falcated in the female.

The underside of the wings is profusely blotched and streaked with black, white, or brown markings, but ocelli are absent. On the hind wing, the tail-like projection at the end of vein 3 is longer than the tooth-like projection at the end of vein 1.

Expanse: 60 - 80 mm.

Range: This species is very widely distributed, ranging all over India, except the extreme North West. It is alo found in Ceylon, Burma, Africa, Madagascar, Mauritius and generally all over the Indo-Malayan Region up to Australia.

Habits: This is one of the commonest and most dull coloured of Indian butterflies. It is found in all types of country except the driest desert regions, and at all elevations up to 7000 feet in the hills. It is common at all seasons of the year. It rests among bushes or other vegetation during the greater part of the day and emerges into the open and begins to be active in the evenings, especially after dusk. Its flight is weak and jerky and when it rests with its wings closed over its back, it harmonises protectively with the colour of its surroundings. They are attracted to ripe fruit and the juice of the palmyrah trees. There is a great deal of individual variation in this species, and perhaps no two individuals are exactly alike.

Melanites phedima varaha Moore.

The Dark Evening Brown.

Plate XVII, fig. 3.

Specimens in the collection: Three, two of which are from Coorg, and the third from the Nilgiris; 63 mm. The smallest specimen (58 mm.) is 10 mm. smaller than the minimum recorded expanse.

Description: This is referred to as a race of *Melanitis bela* Moore, in Bingham's volume on Butterflies in the Fauna of British India series, but *bela* is a synonym for *phedima* which is the name currently accepted.

Wet season form: ♂ ♀ : The upperside is blackish brown, but is usually unmarked, with the ferruginous markings near the apex of the fore wing entirely absent. The termen of the fore wing is straight and not produced. The black sub-apical markings are reduced, absent, or very obscure, with the white central spots absent. The hind wing is uniformly dark brown, without ocelli, and its margin bears a prominent, tooth-like projection at vein 3, streaked with pale purplish lines and small ocelli as in the preceding species.

Dry season form: ♂ ♀ : This is distinguished from the wet season form by the upperside of the forewing being pale ashy or purplish towards the terminal margins. The general ground colour is very dark above and the other markings are more or less similar to the dry season form of the preceding species, but are less sharply defined. On the underside, the general ground colour is darker than in that species and the ocelli are reduced to pale spots.

The southern form of *Melanitis phedima* is the race *varaha* which alone is represented in the collection. The race differs from the typical form of the species in being smaller and much darker with the markings on the upperside near the apex of the forewing more obscure than in the typical form. In the dry season form, the terminal margins on the upperside of both the wings are always purplish.

Expanse: 68 - 70 mm.

Range: The distribution of the species *Melanitis phedima* extends over Ceylon, Burma, South India, Pachmahri and the Himalayas from Kashmir to Sikkim, Assam and Naga Hills, but the race *varaha* Moore is confined to Southern India. The race *bethami* from Pachmahri, Central India, is distinguished by the presence of a broad, yellow patch over the apex of the fore wing.

Habits: This species resembles the preceding one closely in its habits, except that its flight is weaker and it keeps more to the jungles. This species is readily distinguished from the preceding one by the ground colour of its upper side being much darker.

PLATE XVII

PLATE XVII

Fig. 1. *Orostrioena medus mandata* Moore (natural size).

" 2. *Melanitis leda ismene* Cramer (x $^{3}/_{4}$).

" 3. *Melanitis phedima varaha* Moore (x $^{3}/_{4}$).

" 4. *Elymnias hypermnestra caudata* Butler (x $^{3}/_{4}$).

" 5. *Nytha hermiona Linnaeus* (dorsal view, x $^{3}/_{4}$).

" 6. *Nytha hermiona Linnaeus* (ventral view, x $^{3}/_{4}$).

" 7. *Discophora lepida lepida* (Moore) (x $^{3}/_{4}$).

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Genus **Elymnias** Hübner.

This genus includes the butterflies popularly known as the Palmflies. These are brightly coloured insects unlike the members of the preceding genera and resemble specie of Danaids which they mimic very closely.

♂ ♀ : The wings are large, with the terminal margins uneven or scalloped. The forewing is triangular, short, and broad or elongate with a broadly arched costa. The cell is broad and short, less than half the length of the wing. The hind wing is short, broad and ovate, generally more or less produced into a short, tail-like projection at the end of vein 4. The antennae are short, less than half the length of the forewing and with a gradually enlarged club. The males bear secondary sex characters in the form of specialised patches of scales, covered by a tuft of hairs. In Indian species, these are present mostly on the hind wing, near the base.

These butterflies live in wooded country in places where palm trees and cane plantations abound, as these form the food plants of their larvae. Their flight is slow and they keep mostly to thick jungle and shady groves, avoiding direct sunlight. Only a single species is recorded from Peninusular India, and this is the only species represented in the collection.

Elymnias hypermnesta caudata Butler.

The Common Palmfly.

Plate XVII, fig. 4.

Specimens in the collection: Two; their locality is not recorded; 78.5 mm. The largest specimen (87 mm.) is 7 mm. larger than the maximum recorded expanse.

Description: ♂ : The upperside is blackish brown, wih a purplish gloss. The upperside of the forewing bears a series of bluish white spots along the margin. The upperside of the hind wing bears a broad chestnut border.

♀ : This is reddish brown with the apex and margins tinged dark brown, spotted with white. The upperside of the forewing bears a broad, bluish white oblique band below the apex extending from the costa to the termen.

The race *caudata* which is the Southern form, and which alone is represented in the collection, is distinguished by the hind wing being tailed in both sexes. In the male, the chestnut border on the upperside of the hind wing is very broad and edged with a dark border along the terminal margin. The bluish white spots on the upperside of the forewing form a band near the apex. In the female, the veins are conspicuously blackened somewhat as in certain species of Danaids and the white marginal spots on the upperside of the hind wing are obsolete.

Expanse: 65 - 80 mm.

Range: The species as a whole has a wide range, being found all over Peninsular India, Madhya Pradesh and extending as far as Assam, Burma and Ceylon, but the race *caudata* is confined to Southern India, from Travancore to Mysore and the Nilgiris.

Habits: This is the commonest and most widely distributed species of *Elymnias* and is the only species of this genus met with in Peninsular India, the others being found only in Assam and Burma. These butterflies are shade-loving insects, found in cane and palm plantations. Their flight is weak and the male may be often seen sitting for long periods on palm trees with the wings closed. The females are more rarely seen. This species mimics *Danais plexippus*, the Tiger buterfly, very closely, especially while in flight.

Genus **Nytha** Billberg

♂ ♀ : The forewing is broadly triangular, with the costa slightly arched. The apex is somewhat produced and acute. The tornus is rounded. The cell is long, more than half the length of the wing. The hind wing is broadly ovate, with a scallopped terminal border. The cell is well over half the length of the wing. The antennae are short, with abruptly enlarged club. Secondary sex marks are sometimes present in the male in the form of closely packed scales on the forewing.

This genus is widely distributed in the Palaearctic Region. In India, its range is confined to the Himalayas, Kashmir and Baluchistan.

Only a single species, *N. hermiona*, is represented in the collection by a single specimen (55 mm.), but as this species is recorded only from Central and Southern Europe it is not described in the present account. (Plate XVII, figs. 5 & 6).

Among Indian species, only *N. baldiva* and *N. parisatis* seem to be common. Both are recorded from N.W. Himalayas.

Family AMATHUSIDE.

The Amathusids.

Foremerly, the specels of this family were also included in the Nymphalidae, but at present they have been separated into a distinct family - the Amathusidae. These are large, dull-coloured butterflies - although some are brightly coloured. Their wings are large and broad, with the costa on the fore wing strongly arched. The apex is acute and well defined and the termen straight. The underside of the wings generally bears large ocelli and often marked with variegated colour patterns. The antennae are long and slender, with gradually enlarged clubs at the end. The forelegs are small and undeveloped in the male; but larger and stronger in the female, although unfit for walking.

The genus *Discophora* is represented in the collection by a single species, *Discophora lepida lepida* Moore (South India).

Genus **Discophora** Boisduval.

This genus includes the butterflies popularly known as the Duffers.

♂ ♀ : The forewing is broadly triangular, with the costa strongly arched, and with the apex pointed and slightly produced. The termen and dorsum are straight, the tornal angle being almost a right angle. The cell is short and broad. The hind wing is triangular, with the costa slightly arched. The termen is convex and more or less angulate at the apex of vein 4. The tornus is well marked. The antennae bear a gradually enlarged club. The sex mark in the male is in the form of a patch of specialised scales on the hind wing.

Of the three species recorded from India, only one species, the Southern Duffer *Discophora lepida lepida* (Moore), is represented in the collection. But even this species is rare.

Discophora lepida lepida (Moore).

The Southern Duffer.

Plate XVII, fig. 7.

Specimens in the collection : A single specimen from South India; 94 mm. Its exact locality is not recorded.

Description : This species closely resembles D. tullia, the common Duffer.

♂ : The upperside of both the wings is dark glossy brown, but without any bluish white glossy reflections. The forewing is traversed by three pale blue spots with a rather ill defined series of four smaller subterminal spots. The upperside of the hind wing is unspotted, but bears the small, central sex brand which is very conspicuous.

The underside of the wings is yellowish with a broad, dark brown discal band across both the wings, and a prominent subterminal band on both the fore and hind wings.

♀ : The upperside of the forewing bears a bluish white broad band, and the upperside of hind wing bears more numerous, larger and more sharply defined markings. The underside is of a more or less bright yellow colour, with an additional ocellus in area 3.

Expanse : 85-110 mm.

Range : Ceylon and Southern India.

Habits : This species is usually found in the bamboo jungles of Southern India. The eggs are laid on the bamboo leaf along its midrib on its underside. The males are more generally seen than the females. They are active only at dawn and dusk. The males have a very strong scent diffusing from their sex brands. Their flight is fast, though jerky and unsteady. Butterflies of this species are most commonly met with during the months of July and August. The females fly during the day.

Family NYMPHALIDAE

The Nymphalids.

According to the older classification followed in the volume on Butterflies by Bingham in the Fauna of British India series, the forms now grouped under this family were included in the subfamily Nymphalinae of the larger family Nymphalidae which included also the forms at present belonging to the Satyridae and Amathusidae. At present the family Nymphalidae is more restricted.

This family includes large, usually brightly coloured butterflies with a variegated pattern of spots, stripes and blotches, with tawny and black colours often predominating in the colour patterns. The wings are of varied shape, and the hind wing may be tailed, toothed or rounded. The body is thick, with a stout and longish thorax and a comparatively short abdomen. The antennae are long and conspicuously knobbed. The forelegs are imperfectly developed.

In size, the Nymphalids vary a great deal, ranging from very large forms over 120 mm. in expanse to minute ones hardly more than 20 mm. across. There is very little seasonal variation, except in rare cases.

The Nymphalids attain their maximum development in the tropical and subtropical regions of the world. They are sunshine-loving butterflies, and are seldom found skulking in the shade among bushes and trees. Their mode of flight varies a great deal. Some of them fly very rapidly and also at a great height, the Nawabs and Rajahs being the fastest of all butterflies. Others have a jerky flight and fly close to the ground. Some of them, (e.g., the Vanessas) visit flowers. Nymphalids usually rest with the wings widely spread out. Several species of this family exhibit mimicry. The female of the great Eggfly, *Hypolimnas missipus*, for instance, mimics *Danais chrysippus* almost perfectly.

About fifty genera of this large family are known in India, but of these only a comparatively few are represented in the Museum collection.

Genus **Charaxes** Ochsenheimer.

This genus includes large and robust butterflies popularly known as the Rajahs. The wings are tawny or chestnut above, with black apical and terminal markings on the forewings and dark marginal markings on the hind wings. The hind wing in most species is triangular.

On the forewing, the costa is widely arched, with the apex produced. The terminal margin is concave. The dorsum is straight and the tornus rounded. The cell is less than half the length of the wing.

On the hind wing, the costa is widely arched, with the apex very broadly rounded. The termen is straight, more or less scallopped. The males are toothed at vein 4 and in

the females, the termen is produced into a tail at the same place. Occasionally, as in the Black Rajah, it is produced into two tails, at veins 2 and 4. The cell is closed. The dorsum is long, and the tornal angle well defined.

Of the five species commonly known in India, three are recorded only from Assam, Sikkim and Burma, and only the remaining two are known in South India and Ceylon. These two species alone are represented in the Museum collection.

Charaxes polyxena imna Butler.

The Tawny Rajah.

Plate XVIII, fig 1.

Specimens in the collection : One, Nilgiris, South India; 102 mm. This is slightly larger (2 mm.) than the maximum recorded expanse.

Description : ♂ : The upperside is a rich fulvous brown. The forewing is very broadly bordered with black. A broad, white discal band is present, defined on the inner side by a black line. This discal band is continued on to the hind wing. The terminal black border bears near its inner margin a series of yellowish brown spots in some specimens. In the present specimen, there are three such spots.

On the hind wing, the apical area is black and below, this is continued into a subterminal series of black spots, decreasing in size towards the tornus. The apical black patch is marked with two small white streak-like dots. The black spots are outwardly acutely angulated.

The underside is purplish tawny with a silvery iridescence on both the wings. A number of pale streaks connected into irregular lines form a characteristic pattern on the under surface of the wings.

♀ : The wings are much larger and paler than in the male. The upperside is tawny fulvous, paler than in the male. The base of both the wings is of a brownish tint. The discal white band is very broad and the terminal black border of the forewing bears near its inner margin a series of yellowish white semi-lunar markings.

On the hind wing the black, subterminal series of spots are marked with conspicuous white spots. The tail at the termination of vein 4 is produced.

The antennae are black and the head, thorax and abdomen fulvous brown.

The species *Charaxes polyxena* (Cramer) is subject to considerable variation in the colour markings and ground colour of its wings, especially of the underside of the wings, and based on these variations as many as four races have been recorded, namely, *psaphon*, Ceylon, *imna*, South India to Orissa, Madhya Pradesh and Konkan, *hemana*, Mussooree, and *hierax*, Sikkim to Assam and N. Burma. The present race, *imna* Butler, to which the specimen in the museum collection belongs, is similar to the typical form

psaphon, but the black border is comparatively narrower and some tawny brown markings may be present near the border on the tornus of the upperside of the forewing in the male of the dry season form. In the volume on Butterflies by Bingham in the Fauna of British India, series, *imna* is treated as a race of *C. psaphon* which is dealt with as a separate species, but later works treat both as races of the single species, *C. polyxena*.

Expanse: 90 - 100 mm.

Range: As indicated above, the range of the species as a whole is very extensive, but that of the present race is confined to South India to Orissa, Madhya Pradesh and Konkan.

Habits: This species is one of the most beautiful and at the same time active member of the genus *Charaxes*. The males are much smaller than the females. It is difficult to collect specimens of this species as the male frequents the tree tops and the female generally keeps within dense cover. In South India, it has been recorded from the jungles of the Malabar Coast along the Western Ghats and in Mysore, Wynaad and the Nilgiris. Generally it is found at low elevations.

Charaxes fabius fabius (Fabricius).

The Black Rajah.

Plate XVIII, fig. 2.

Specimens in the collection: One; its exact locality is not recorded; 68 mm. This is slightly smaller (2 mm.) than the smallest recorded expanse.

Description : ♂ ♀: The upperside is black; both fore and hind wings are traversed by a yellowish green or whitish discal band, broken up into a series of spots towards the apex of the forewing. There is also a subterminal series of similar but smaller spots, disappearing towards the apex of the forewing. The forewing, in addition to these spots, bears a sulphur-yellow spot beyond the lower apex of the cell and an oblong costal spot beyond it. The hind wing bears an additional series of sulphur-yellow terminal spots, terminating in a large, bluish green spot at the tornal angle. The apices of veins 2 and 4 are produced to form two equally well developed tails. The tails are longer in the females, but sharper in the males.

On the underside, the ground colour is dark grey, with the basal area of both the wings traversed by transverse black lines. The cell of the forewing bears three black spots. The discal band is white, with a series of dark yellow subterminal spots and two terminal white spots near the tornal angle. The underside of the hind wing bears a subterminal and terminal series of larger, dark yellow spots which are bordered with dark margins. In addition, there is an inner subterminal series of white spots and a posterior terminal black line. The terminal area is purplish grey in both the wings.

PLATE XVIII

PLATE XVIII

Fig. 1. *Charaxes polyxena imna* Butler (x $^3/_4$).

" 2. *Charaxes fabius fabius* (Fabricius) (x $^3/_4$).

" 3. *Eriboea athamas agrarius* Swinhoe (x $^3/_4$).

" 4. *Apatura parisatis atacinus* Fruhstorfer (x $^3/_4$).

" 5. *Euripus consimilis meridionalis* Wood-Mason (x $^3/_4$).

" 6. *Euthalia lepidea* (Butler) (x $^3/_4$).

" 7. *Euthalia garuda* (Moore) (x $^3/_4$).

" 8. *Euthalia nais* Forster (x $^3/_4$).

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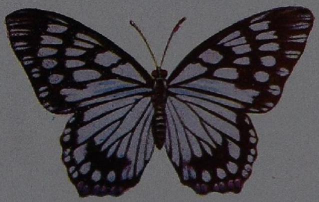

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Expanse: 70 - 80 mm.

Range: Ceylon; India, except the extreme North West; Himalayas, Sikkim, Bhutan, Central and Western India; South India; Assam, Cachar, Burma.

Habits: This species is the most widely distributed member of the genus and is found in both hills and plains. Its food plant is the common Tamarind, and this perhaps accounts for its wide distribution. This species is very strong and active in its flight, and is found mainly at low elevations. These butterflies are protectively coloured and are attracted to ripe fruit and palm juice. They generally settle high up on the trees. The males frequent shady groves and fly in the vicinity of water.

Genus **Eriboea** (Moore)

This genus includes large, attractive butterflies popularly known as the Nawabs. They are more or less similar in appearance and habits to the preceding genus. They are either black above with a broad, pale, discal patch on both the wings and with small white dots on the dark terminal margin of the hind wing, or pale yellow with a broad, black, apical and terminal area on the forewing and marginal markings on the hind wing. As in the preceding genus, the hind wing is tailed at the apices of veins two and four in both the sexes.

This is a synonym for *Eulepis* which is the older name under which it is deseribed in the volume on Butterflies by Bingham in the Fauna of British India series and in "Butterflies of India" by Antram.

Only a single species, *Eriboea athamus*, which is one of the two species recorded from South India, is represented in the Museum collection. Most of the species of this genus are confined to Sikkim, Assam and Burma and some species extend into the Malayan sub-region also.

Eriboea athamus agrarius Swinhoe.

The Common Nawab.

Plate XVIII, fig. 3.

Specimens in the collection: Four; of these two are from India, and the other two from Rangoon, Burma. Of the two Indian specimens, one is from Pulneys; the exact locality of the other is not known. A fifth specimen from America is also represented, but it is probably a different species; 63.5 mm.

Description: ♂ ♀ : The upperside is black; the fore and hind wings bear a broad discal transverse area. This is of a pale sulphur-yellow colour and is of varying width. Sometimes the band has a greenish tinge. On the apical area of the forewing, a large sulphur yellow spot is present followed by a small dot beyond, also of the same colour. On the hind wing there is a subterminal row of small, pale yellow, transversely elongate streak-like spots. A terminal row of darker yellow spots is also present in typical

specimens, but these are practically absent in the present specimens. The tornal angle bears a large yellowish spot with a bluish border. The apices of veins two and four are produced into two pointed tails, which are tinged with bluish grey.

The underside bears the discal band and apical spots of the forewing as on the upperside, but these are paler, the discal band being bordered on the inner side by a broad, dark brown band margined with black lines. In addition, a subterminal series of dark lunules on the forewing and dark red lunules on the hind wing are present. There are obscure marginal black, white and yellow spots on the hind wing. The females are larger than the males and have the discal band and sub-apical spot of the forewing more extensive. There is a great deal of variation in this species in the width and colour of the discal band.

Expanse: 60 - 75 mm.

Range: Kulu to Assam and Burma; the Himalayas, from Kashmir to Sikkim; Western and Southern India, Ceylon; practically throughout India.

Habits: This is the commonest and most widely distributed species of the genus; This species has been divided into a number of races, of which at least two may be mentioned. *(1) E. athamas athamas* the Northern and Eastern race, and *(2) E. athamas agrarius*, the Southern Indian and Ceylon race, to which the two Indian specimens in the Museum collection belong. But each race is so variable in itself that the distinguishing features are not very distinct. This butterfly is found in forested regions throughout the Peninsula and is most abundant in jungles, especially in the Himalayas. It is also sometimes found in open country. As usual, the females are more retiring, and are seldom seen. Specimens of this species may often be seen flying around and settling on tree tops, but they also sometimes fly low and settle on damp patches and manure heaps.

Genus **Apatura** Fabricius.

The genus includes robust butterflies of medium to small size, popularly known as the Emperors. The colour of the wings is rather variable. On the upperside, some are dark brown, with white or tawny markings. In some, the males are glossy black. In most species there is an ocellus on the underside of both wings.

In the forewing, the costa is slightly arched, and the apex rounded and somewhat produced. The termen is concavely indented in the middle. The tornus is rounded. The hind wing is ovate, with the costa slightly arched and the termen nearly straight, but with a scallopped margin. In some species, the hind wings are narrowed posteriorly. The antennae are long, well over half the length of the forewing.

The males are sunshine-loving insects, flying strongly and often seen basking on leaves near the tops with their wings open. They are attracted to over-ripe fruit and manure heaps, but seldom visit flowers. The females are seen less frequently as they keep to the undergrowth. All the species frequent only jungle country.

Most of the Indian species of this genus are confined to Assam, Sikkim and Burma. Only a single speeies, *Apatura parisatis* Westwood, is rocorded from South India and Ceylon, and this is the only species of the genus represented in the Museum collection.

Apatura parisatis atacinus Fruhstorfer.

The Black Prince.

Plate XVIII, fig. 4.

Specimens in the collection: Four, of which two are from Pulney Hills and one is from Coorg. The exact locality of the fourth specimen, which is rather damaged, is not known. One of the specimens from the Pulneys is a female, the rest are males; 54 mm. The largest specimen measures 58 mm., which is 8 mm. larger than the maximum recorded expanse.

Description : ♂ : The upperside is uniformely velvety black, without any markings except for a minute white apical dot on the forewing. The underside is dark purplish brown with dark ferruginous brown shading at the base of the wings and along the costal margin and the forewings. Two black spots are present in the discal area in both the fore and hind wings. In the forewing the white pre-apical spot is larger than on the upperside. The antennae and the body are black.

♀ : The upperside is yellowish brown. The basal area in both the wings is shaded with an angulated median outward projection of the shaded brown area. The discal band is broad and paler, but is irregular on the hind wing. On the hind wing, the basal shade area is also traversed by a series of obscure dark spots. The underside is yellowish or ochraceous brown with the markings more or less the same as on the underside of the male. The antennae and body are light brownish, yellowish below.

Expanse : 45-50 mm.

Range : The range of the species as a whole extends over Ceylon, South India, Kumaon to Assam and Burma. The present race, which is the southern race, is found in Ceylon and Southern India, and has been separated as race *cambia* Moore, in Bingham's volume on Butterflies in the Fauna of British India series, but this appears to be a synonym for *atacinus* Fruhstorfer, which is the race name mentioned in the labels in the collection.

Habits : The males are more frequently seen. It has a powerful flight and comes out in the sunshine settling on low bushes and trees. The female is more retiring and keeps much to the shade of low bushes and undergrowth. This species is always found in hilly, wooded country. In South India, it is confined to the Western Ghats, Pulneys, Nilgiris and Travancore Hills.

Genus **Euripus** Westwood.

This genus includes the butterflies popularly known as the Courtesans. Of the two Indian species of the genus, one is found only in Sikkim, Assam and Burma, while the other, *Euripus consimilis* (Westwood) which alone is represented in the collection, is known also from South India.

The forewing is triangular, with the costa broadly arched. The termen is convex, but slightly concave behind the middle, and slightly angulated at the termination of vein 2. The hind wing is more or less triangularly ovate, or subquadrate. with the terminal margin scallopped and produced at the tornal angle.

Species of this genus, especially the females, mimic those of Danaids very closely.

Euripus consimilis (Westwood).

The Painted Courtesan.

Plate XVIII. fig. 5.

Specimens in the collection : One, Nilgiris; 80 mm.

Description : ♂ : On the upperside, the forewing is black, with broad, white streaks and spots; these include a long white streak from the base in area 1, a slender streak in the cell, and a broad, oblique, median band, followed by a row of paired, white streaks in interspaces 3, 4 and 5 and a post-discal series of slender streaks. A terminal row of white dots, elongated into streaks towards the apex, are also present.

The hind wing is white, traversed by black veins. The termen is black, with a subterminal row of four or five crimson spots posteriorly and beyond this, there is a regular, terminal row of white spots.

The underside is similar, but the underside of the hind wing bears crimson basal markings.

♀ : This is similar to the male, except that the upperside of the hind wing is clear white, or crimson-coloured and the tornal red spots are absent. The discal band is found only in the Southern form, *E. consimilis meridionalis* Wood-Mason, to which the single specimen in the collection belongs. But the females have the basal crimson patch on the underside of the hind wing. The antennae are black, and the head, thorax and abdomen are black and marked with white beneath.

Expanse: 60 - 85 mm.

Range: Southern India; in North India, its distribution ranges eastwards from Dehra Dun to Sikkim and to Assam and Burma and westward, from Sikkim to Kumaon.

Habits: This is a rare species, although it is widely distributed, especially in regions having plenty of rainfall. In South India it has been recorded from the Nilgiris and Pulney

Hills, where it may be found flying at low elevations. These butterflies frequent dense jungles. The males have a weak, fluttering type of flight and may often be seen resting on tops of high trees, with the wings partially open. The flight of the female resembles that of the Denaids. This species closely mimics the Danaid, Blue Glassy Tiger *(Danais limniace)* in its pattern of colouration and general appearance.

Genus **Euthalia** Hübner.

This genus includes large, robust, strongly built butterflies popularly known as the Barons, Counts, Earls and Dukes. Although more than a dozen species of this genus are recorded in India, most of them are known only from Assam, Sikkim and Burma, only about three species being found in South India and Ceylon. All these three species from South India are represented in the Museum collection. These are, as a rule, dull-coloured butterflies.

♂ ♀ : The forewings are typically triangular, with a broadly arched costa. The termen is straight anteriorly, but concave behind. The tornal angle is well defined. The hind wing is more or less subquadrate with a broadly rounded apex and a tornus which is often produced and angulated. Males are generally dark brown on the upperside while females are usually larger and paler. These butterflies (both males and females) are generally attracted to over-ripe fruit or toddy and hence they may be easily caught using suitable baits. Males and females are equally common and of similar habits in this species, unlike as in most other species of butterflies.

Euthalia lepidea (Butler)

The Grey Count.

Plate XVIII, fig. 6.

Specimens in the collection: Three, one of which is from Trivandrum, and the other from Rangoon, Burma; 71.5 mm.

Description: ♂ ♀ : The apex of the forewing is produced and the termen is falcated below the apex. The termen of the hind wing is straight, but slightly angled at vein 3. The upperside is dark brown with obscure black transverse markings across the cells of both the wings. The male bears a uniform pale grey marginal area which broadens gradually from the apex of the forewing to the tornus of the hind wing. In the female, this marginal band is duller and darker.

On the underside, in the male, the forewing is yellowish brown and the hind wing paler. In the female, the forewing is bright yellow, and the hind wing paler yellow. The terminal markings are bluish grey. On the underside of the forewing, the outer discal line is undulated and runs parallel to the termen. The underside of both the wings are traversed by diffuse broad discal and narrower post-discal dark coloured bands.

Expanse: 65 - 80 mm.

Range : Peninsular India, South India, Orissa, Bengal and Central India. In South India, it has been recorded from the Nilgiris, Canara, Mysore and Travancore. In North India, its distribution ranges from Kumaon to Burma, and even to Malay Peninsula.

Habits : This species is rather rare in South India, but commoner in North India. It is generally found in forests, especially in the more moist jungles. These butterflies may be met with in jungle clearings and paths adjoining wooded districts and are fairly abundant at low elevations in the Himalayas in North East India. In South India, they are locally common on the western side of the Nilgiri Hills. Like the preceding species, they are attracted to fruit and tree sap.

Euthalia garuda (Moore).

The Baron.

Plate XVIII, fig. 7.

Specimens in the collection : Two, Calicut, Malabar. One of these is a female; and is larger than the other; 67 mm

Description : ♂ : The upperside is dark brown, with characteristic loop-like markings in the cell of both wings. These markings are followed by a discal dark brown band bordered on the outside by a series of five white spots. Beyond these, two small, pre-apical spots are present. Both wings bear a subterminal series of dark spots, but these are more distinct on the hind wing. The hind wing bears a discal series of dark brown elongate spots, pointed outwardly and diffuse towards the inside, in addition to the series of subterminal black spots.

The underside is paler brown, the markings being more or less similar to those on the upperside. A broad terminal pale lilac band is present, bordered by a narrow, dark brown line along the termen.

♀ : This is larger and much paler than the male, with the discal white spots on the forewing being much larger and more elongate; they are also more variable in size and form. A straight, broad, white discal band is present in the Ceylon race (*vasanta* Moore). The underside is more yellowish with the markings larger and duller than in the male.

Expanse : 55-80 mm

Range : The Himalayas, at lower elevations. Assam, Cachar, Burma and extending to the Malay Peninsula and Sumatra; South India and Ceylon.

Habits : This is a common species, and is the most widely distributed member of this genus. It is found on the plains and at low elevations on the hills up to about 4000 feet. These butterflies fly rapidly and often settle on the ground with the wings spread out.

They are sunshine-loving insects, and are attracted to over-ripe fruit and sap exuding from trees, like other species of the genus. Their food plants are Mango and Cashew-nut trees. This species is rather variable in the number of discal white spots which may sometimes be reduced to two or absent altogether.

Euthalia nais Forster.

The Baronet.

Plate XVIII, fig. 8.

Specimens in the collection : Two, one of which is from Mysore. The locality of the other specimen is not recorded; 66 mm.

Description : ♂ ♀ : The upperside is brownish yellow, the ciliary fringe of both wings being black, alternated with white. The forewing bears a bar at the apex of the cell, with a large spot below it. There is also a broad, oblique discal bar and a post-discal band. The margin of the termen is black. The hind wing bears a large black spot below the middle of the costa and a post-discal series of black spots. The black border on the terminal margin is broader than in the forewing.

The underside is brownish yellow. The forewing bears two crimson spots at the base of the cell, and beyond this, a crimson line edged with black. A black patch is present at the base of areas 2 and 3 as on the upperside, and a dark brown oblique discal band extends from the costa to vein 4, bordered on the outside by a series of large, whitish spots. A subterminal series of white lunule-like spots is also present. The underside of the hind wing bears a crimson line at the base of the costa, two crimson spots in the cell, bordered with black, a discal white band, broken up into spots and a post-discal series of small, black spots.

The head, thorax and abdomen are tawny red above and brownish pink below. The antennae are black, tipped with bright brown.

Expanse : 60-70 mm.

Range : South India; Ceylon, Lower Himalayas; Dehra Dun to Sikkim. Madhya Pradesh and Saurashtra. Practically throughout the plains in Peninsular India.

Habits : This is a sunshine-loving species and inhabits the dry areas in forested country at low elevations. It is more common in the plains than on the hills. Its flight is rather weak and always close to the ground. It flies only short distances at a time, settling frequently. One of the food plants of this species is the sal tree, *Shorea robusta*. This butterfly is one of the most brightly coloured species of the genus, and, like other members of the genus, it is attracted to over-ripe fruit and tree sap.

Genus **Parthenos** Hübner.

This is a genus of large, strikingly coloured butterflies known popularly as the Clippers, with a powerful flight. Only a single species is known in India, although three races of this species have been recorded. In the Fauna of British India volume on Nymphalidae, two of these races are described as distinct species and the third race as a race of one of these species.

♂ ♀ : The forewing is elongately triangular with the costa slightly arched. The termen is slightly scallopped. The cell is long, narrow and closed, about half the length of the wing. The hind wing is subquadrate, with the costa slightly arched and the termen scallopped more prominently than in the forewing, anteriorly, but straight posteriorly. The portion from vein 4 to tornus is slightly produced. The antennae are long, more than half the length of the forewing.

The single recorded Indian species is represented in the collection by the race *virens* which is the South Indian form. The Ceylon form is *cynaeus*, and the North Indian race, found in Assam, Cachar and East Bengal is *gambrisius*.

Parthenos sylvia virens Moore

The Clipper.

Plate XIX, fig. 1.

Specimens in the collection: Four, of which two have their wings somewhat mutilated. One of the specimens is from Trichur, Malabar, one from the Nilgiris, and two from Trivandrum; 102 mm.

Description: The following description applies to the typical form of the species, *P. sylvia*.

♂ ♀ : The ground colour is bright green. The forewing bears two broad, black streaks from the base, and very large, semi-transparent white spots, bordered with black on the discal area. Post-discal and terminal black bands are also present.

On the hind wing, a basal and sub-basal black streak and a transverse series of black spots, getting smaller anteriorly, are present. In addition, two subcostal white spots are present. The discal area bears dark brown or blackish paired streaks in the interspaces, coalescing on the outside, and beyond this, there is a post-discal series of triangular dark spots and a terminal broad, dark band.

The underside is pale bluish green, without the black streaks from the base of the wings, but with the other markings as on the upperside, although less clearly defined. The ground colour fades into an ashy grey towards the terminal margin.

The antennae are black, and the head, thorax and abdomen bronze green barred with black above, whitish beneath.

Parthenos sylvia virens Moore, which is the South Indian race represented in the collection, resembles very much the typical form described above, except that the ground colour of the upper side is bronzy green and that of the underside is pale greenish grey, merging into the ashy grey colour of the terminal margins of the forewing. The discal transverse sinuous black line on the underside of the hind wing is also much interrupted and incomplete.

Expanse: 105-125 mm.

Range: The range of the species as a whole extends over Ceylon, Western Ghats, Nilgiris, East Bengal, Assam and Burma, but the race *virens* is confined to South India (Western Ghats, Travancore and Nilgiris).

Habits: This is one of the most magnificent of all Indian Nymphalids. The bronzy green race from South India is particularly beautiful. This species is confined to thick jungles with plenty of rainfall. In the Western Ghats, it is common at elevations between 1000 and 3000 feet. It is capable of very strong and powerful flight, being often found gliding on outspread wings for short distances. It is mainly found hovering high among the trees, and frequently settles on leaves at the tree tops with the wings spread out horizontally. This is one of the largest and most striking species of South Indian Nymphalids.

Genus **Limenitis** Fabricius

This genus includes medium-sized butterflies popularly known as the Admirals. They are brown, with usually a white band across both the wings, the band being either continuous or broken up into spots.

♂ ♀ : The forewing has the apex produced and the costa slightly arched. The tornus is obtuse. The cell is short, narrowly closed, and less than half the length of the wing. The hind wing is pear-shaped, with the apex rounded and the costa slightly arched. The terminal margin is even or slightly scallopped. The antennae are longer than half the length of the wing in the Indian species, with a gradually enlarged club.

These butterflies are mostly hill species, inhabiting wooded areas with plenty of rainfall. Their flight is strong and swift and they often glide in the air with the wings spread out.

Of the eight Indian species, most of which are known only from Assam, Sikkim and Bhutan, only a single species, *Limenitis procris* is represented in the collection, this being the only species that is found in Ceylon and Peninsular India, south of the Central Provinces.

Limenitis procris undifragus Fruhstorfer.

The Commander.

Plate XIX, fig. 2.

Specimens in the collection: One, Malabar; 63 mm.

Description: This species has been referred to as *Moduza procris* in Bingham's volume on Butterflies in the Fauna of British India series, and in Antram's Butterflies of India, but it is now treated as a species of *Limenitis*.

♂ ♀ : The upperside is rich rufous brown with a broad, discal white band across both the wings. There are short, transverse black lines on the base of both the wings. Two pre-apical white spots are present on the forewing. The terminal border of the forewing is black, with inwardly pointing triangular spots and traversed by two fine, closely set, parallel, undulated lines, arched into lunule-like curves against the black spots. The hind wing bears a post-discal series of black spots, with an outer series of black spots, a subterminal black line, and a terminal black band.

The underside bears similar, but more clearly defined markings. The basal portions of the wings are pale blue on the underside. The body is rufous brown above and bluish white below. The antennae are black, the tip being ochraceous brown.

Expanse: 60 - 75 mm.

Range: The Himalayas, Assam and Burma; Bengal, Peninsular India, south of Madhya Pradesh, and Ceylon.

Habits: This is the best known and most widely distributed member of the genus in India, inhabiting wooded regions with heavy or moderate rainfall. This species frequents low elevations and may often be met with in open places and clearings adjoining forest. Bell has given a detailed description of the larval stages and metamorphosis of this species.

The present race, *undifragus* Fruhstorfer, is confined to Peninsular India. The Ceylon race is designated as *calidasa* Moore, which is a darker form, with the upperside of the wings dusky brown.

Genus **Pantoporia** Hübner.

This genus includes medium-sized, dark-coloured butterflies, popularly known as the Sergeants. The upperside is dark brown, with markings similar to those of the genus *Neptis*, but may be distinguished from the latter by the abdomen being usually barred with white or tawny yellow in continuation of the inner discal band of the hind wing.

PLATE XIX

PLATE XIX

Fig. 1. *Parthenos sylvia virens* Moore (x $^3/_4$).

" 2. *Limenitis procris undifragus* Fruhstorfer (x $^3/_4$).

" 3. *Pantoporia solenophora kanara* Evans (x $^3/_4$).

" 4. *Pantoporia perius* (Linnaeus) (x $^3/_4$).

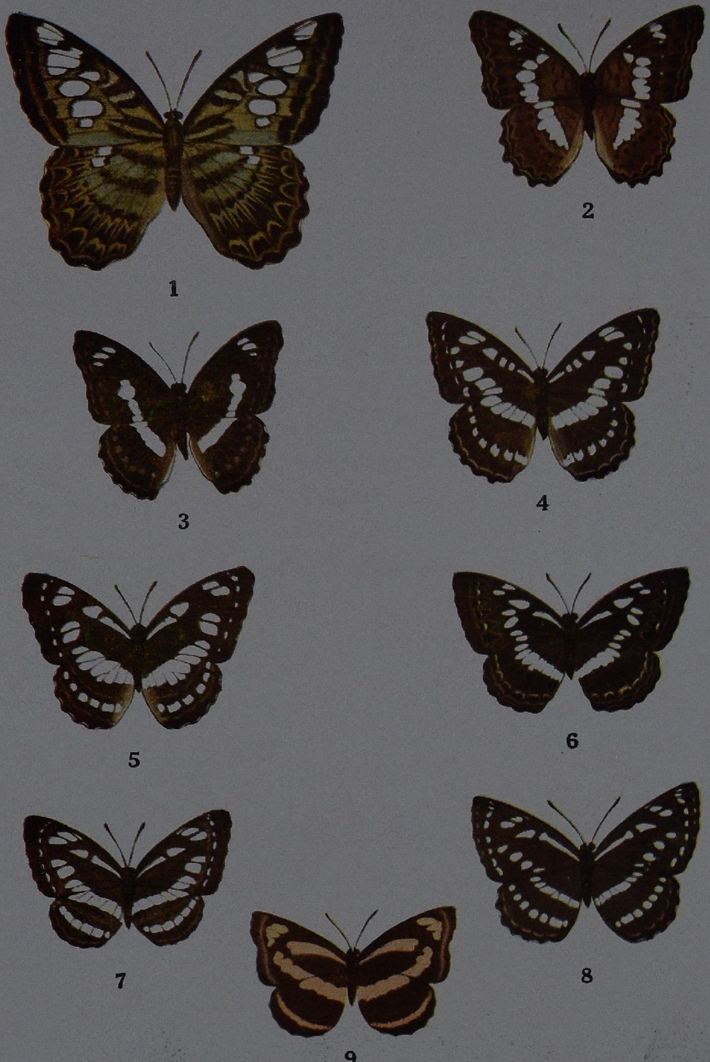
" 5. *Neptis columella nilgirica* Moore (x $^3/_4$).

" 6. *Neptis jumbha jumbha* Moore (x $^3/_4$).

" 7. *Neptis hylas varmona* Moore (x $^3/_4$).

" 8. *Neptis soma kallaura* Moore (x $^3/_4$).

" 9. *Neptis hordonia hordonia* Stoll (natural size).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♂ ♀ : The forewing is short, broad and triangular, with a blunt apex and the costa strongly arched. The termen is nearly straight, The cell is narrowly closed. In the hind wing, the costa and the termen are rounded, and the dorsum is nearly straight. The cell is open.

The antennae are over half the length of the forewing with a long, narrow and gradually enlarged club.

Species of this genus inhabit wooded areas having plenty of rainfall, especially in the hills. Their flight is strong and usually consists of a few rapid flapping movements of the wings, followed by a smooth glide with the wings held slightly below the horizontal. These butterflies frequent the vicinity of streams and rivulets in forests and often settle down on leaves and bushes, with outspread wings.

About a dozen species are known in India, but most of them are from Assam, Sikkim and Kashmir, and the range of many of them extend also into Burma. Only four species are found in Peninsular India and in the Western Ghats, and of these only two are represented in the Museum collection.

Pantoporia selenophora kanara Evans.

The Staff Sergeant.

Plate XIX, fig. 3.

Specimens in the collection: Two, one from Nilgiris, and one from Coorg; 65 mm.

Description: ♂ ♀ : The upperside is black. The forewing bears a deep red streak in the cell, divided twice by a brown line. The discal and terminal markings are white. The fringe on the terminal margin is black, alternated with white. The underside is bright chestnut red with the white markings as above. The underside of the hind wing bears a series of dark chestnut red marks. In the male, the abdomen is not banded with white above. The outer discal band on the hind wing is obscure. The discal band is white, tinged with blue at the edges. The female has a white transverse band on the upperside of the abdomen.

Expanse; 55 - 75 mm.

Range: Western Ghats, Nilgiris, South Bihar, Coorg, Himalayas, Simla, Assam and Burma.

Habits: This species frequents low elevations in the Himalayas. It is locally common in certain places, and is often found near streams and rivulets in forests. In South India it is found in the evergreen forests of the Nilgiris and Western Ghats.

Pantoporia perius (Linnaeus).

The Common Sergeant.

Plate XIX, fig. 4.

Specimens in the collection: Two, one from Pulneys and the other from Coorg; 60 mm.

Description: This species is referred to by Antram in his book, "Butterfliies of India" under the generic name *Athyma* which is but a synonym for *Pantoporia.*

♂ ♀ : The upperside is black in the male and dark brown in the female, with white markings. The upperside of the forewing bears a cell streak, broken up into three portions (i.e., divided twice), a large double spot beyond, and a discal band formed of a series of close-set spots, a post-discal series of narrow, transverse spots, and finally a subterminal row of fine, faintly marked lunules. In the hind wing, there is a broad, discal band basally and a post-discal series of O-shaped spots bordered on the inside by round black spots and a subterminal series of faint, light brownish lunules.

The underside is bright yellow, with the white markings as on the upperside, but heavily bordered with black, and both wings have a terminal narrow black band on the underside. The body is black above with bluish white transvere bars on the abdomen; below, the body is white.

Expanse: 60 - 70 mm.

Range: The Himalayas, from Simla, eastwards throughout the hills of Western, Central and Peninsular India also. Burma and Southern India.

Habits: This is one of the bestknown and most widely distributed species of the genus. It is not common, but may be locally abundant in certain areas. It keeps mostly to low elevations and usually flies close to the ground. Its flight is strong, and it keeps flying most of the time seldom settling down on leaves or on the ground.

Genus **Neptis** Fabricius.

The species of this genus closely resemble those of the preceding one in colour and colour markings and are popularly known as the Sailers. They are medium-sized butterflies with black or dark brown wings marked with three horizontal bands which may be white, obscured, or tawny brown or yellow. These consist of a streak across the cell, a broader discal band and a third outer band continuous in both the wings. There are also other isolated white markings especially in the apical region. The wings are rather narrow and produced.

These butterflies are confined to the wetter, hilly regions at moderate elevations and can be easily recognized by their graceful, sailing type of flight in which the wings are held

horizontally. The markings are identical in both the sexes but there is considerable seasonal variation.

This is a large genus comprising numerous species of which some are found in South India, but most of them are confined to the Himalayas, Assam and Burma. Only five of the most well known South Indian species are represented in the Museum collection.

Neptis columella nilgirica Moore.

The Short-banded Sailer.

Plate XIX, fig. 5.

Specimens in the collection: One, Nilgiris; 65 mm.

Description: ♂ ♀ : The upperside is black, with white markings. The upperside of the forewing bears the characteristic white streak in the cell. This streak is widest at the apex and bears a notch towards its pre-apical end. A large triangular spot is present beyond, well separated from the main streak. The broad white discal band is composed of spots arranged in pairs. The spots of the post-discal series are small and ill defined. In the hind wing, the costal margin is greyish brown and there is a broad sub-basal band, a series of post-discal spots which are larger and bolder than those of the forewing, and a pale subterminal line.

The underside is greyish brown with the white markings as on the upperside, but broader. The terminal margins of the wings on the underside are traversed by pale, crescent-like markings. The body is greyish brown above, white beneath.

Expanse: 60 - 70 mm.

Range: Southern and Western India, Sikkim, Bhutan, Assam, Bengal, South Bihar and Burma. It is rare in South India, where it is confined to the hills.

Habits: This is a somewhat rare species, mostly confined to the hills. In South India, it is rarer still, and is found mostly in the evergreen and deciduous forests of the Nilgiris and Western Ghats, Coorg and Mysore. The larvae feed on species of *Dalbergia*, a Leguminous plant.

Neptis jumbha jumbha Moore.

The Chestnut-streaked Sailer.

Plate XIX, fig. 6.

Specimens in the collection: One, Pulneys; 60 mm.

Description: This species is very similar to the preceding one.

♂ ♀ : The upperside is black, with the markings similar to those of *Neptis columella*, but with the discal bands narrower and the interspaces deeper black. The white markings have a pale bluish green tinge in fresh specimens. The two hindmost spots in the discal series of the forewing are almost equal in size.

On the hind wing, the post-discal series of white, lunule-like spots are somewhat diffuse and confluent and form a more or less continuous narrow pale band.

The underside is paler than in the preceding species and in the forewing there are usually prominent dark, chestnut-brown streaks beyond the cell. The spaces between the veins are much darker than in *N.columella* and there is a discal transverse series of large brown spots, but the post-discal markings are rather diffuse. The body is black above, and white below.

Expanse: 60 - 70 mm.

Range: Ceylon, South India, Nilgiris and Travancore, Kanara, Bengal and Burma.

Habits: This is a common species confined mostly to wooded country. It has not been recorded from the Himalayas. It is mostly found at low elevations. The larvae feed on various Leguminous and Malvaceous plants. The habits are more or less similar to those of the other members of the genus, with the same characteristic sailing flight. *Neptis jumbha jumbha* Moore is the South Indian race to which the single specimen in the collection (from Pulneys) belongs.

Neptis hylas varmona Moore.

The Common Sailer.

Plate XIX, fig. 7.

Specimens in the collection: Ten, Madras, Cochin, Pulneys and Coorg; 60 mm. The largest specimen (62 mm.) is slightly larger (2 mm.) than the maximum recorded expanse.

Description: This species is described by Bingham in his volume on Butterflies in the Fauna of British India series under the name, *Neptis eurynome of* which the typical form has been designated as *varmona*. Races of this species are also known from Andaman and Nicobar Islands.

♂ ♀ : *Dry season form* (which alone is represented in the collection): The upperside is black, with white markings. The forewing bears a wide streak, narrow behind and broad and truncated in front, and a large triangular white spot beyond the apex of the cell. There is also a discal series of well separated white spots and a post-discal series of small white spots, but this series is incomplete.

The hind wing bears a prominent, white, sub-basal band equally broad throughout, and a post-discal series of squarish white spots, well separated. Discal and subterminal pale lines are obscure.

The underside is normally golden brown, but varying in shade from an ochraceous brown to dark chestnut, and with the white markings as on the upperside, but sharply edged with black lines. On the forewing, the interspace 1 is shaded with black and narrow white markings are present, on both sides of the post-discal series of spots. The underside of the hind wing bears a white streak on the costal margin at the base and another streak below it. The discal and subterminal white lines are narrowly edged with black. The antennae, head, thorax and abdomen are black above; the body is dusky below.

In the *Wet season form* the white markings are narrower with broader black margins.

Expanse: 50 - 60 mm.

Range: Throughout India, Burma and Ceylon. In India, it is particularly abundant in Assam. Its distribution extends to China and Malay Peninsula.

Habits: This is the commonest and most widely distributed species of the genus. This is the only species of the genus, in which the underside is a rich golden brown, by which this species is easily recognized. It is found almost everywhere and is specially common in gardens, groves and wooded regions. It flies in the usual manner characteristic of the other species of the genus, i.e., flapping the wing repeatedly and then gliding along gracefully with the wings spread out. It often settles on damp patches of sand. Its colour harmonises well with the checkered patterns produced by sunlight and shadows among vegetation.

Neptis soma kallaura Moore.

The Sullied Sailer.

Plate XIX, fig. 8.

Specimens in the collection: One, Pulneys; 65 mm.

Description: ♂ ♀ : The upperside is black, with sullied white markings. In the forewing, the cell bears a narrow white streak, somewhat enlarged at the tip and a narrow, elongate, triangular spot beyond it. The spots in the discal series are few and widely separated. The post-discal series of spots are more numerous and close-set. In the hind wing, the sub-basal white band is narrow and there is a post-discal series of white spots which is sometimes represented only by a pale band. The underside is chocolate brown, with markings as on the upperside but more indistinct. On the underside of the hind wing the pale discal and subterminal markings of the upperside are replaced by narrow white bands and in the female, there is an additional terminal white band. The antennae, head, thorax and abdomen are black above and the body is dusky beneath.

The present specimen belongs to the race *kallaura* Moore, which is the South Indian race. In Bingham's volume on Butterflies in the Fauna of British India series, this race is said to be recorded only from Travancore, and he describes another race, *hampsoni*

from the Nilgiris, Anamalais, and the hills of Mysore, but Wynter Blyth recognizes only one race as being found all over the hills of South India generally and on the Western Ghats, namely, the race *kallaura*. The present specimen is from Pulney Hills. This race resembles the typical form very closely, except that the sub-basal band of the hind wing is attenuated at each end, and not of even width. Further, the spots forming the outer discal band on the upperside of the forewing are widely separated, while they are coalescent in the typical form.

Expanse: 50 - 70 mm.

Range: The species, as a whole, extends in its distribution, over the Himalayas, Sikkim, Assam,Cachar, Burma and Southern India, but the race *kallaura* Moore is restricted to the Western Ghats and other hills of Southern India. Another race, *clinia* Moore, is recorded from the Andamans.

Habits: This species is much less common than the preceding one, but is very similar to it in its habits and methods of flight. It may be at once distinguished from the preceding species by its much narrower white markings on the upper side of the wings. This species is found chiefly at low elevations and is locally common in certain localities especially during the rains.

Neptis hordonia hordonia Stoll.

The Common Lascar.

Plate XIX, fig. 9.

Specimens in the collection: One, Malabar; 44 mm.

Description: In the older classifications (Antram, Bingham, etc.), this species has been treated as a member of the genus *Rahinda*, but Wynter Blyth has included it in the genus *Neptis*, as the species formerly separated into the genus *Rahinda* are not sufficiently distinctive as to warrant separation into a distinct genus.

♂ ♀ : The upperside is black, with yellowish orange markings. On the forewing, the streak in the cell is long, broadened anteriorly and indented twice towards the front end. The posterior row of discal spots are conjoined, and the anterior, obliquely elongated series of spots are also similarly conjoined. A post-discal curved pale line and a fine, obscure, terminal orange line are also present. The upperside of the hind wing bears a broad, sub-basal band and a narrow, broadly curved, post-discal band. On the underside, the markings are more or less as on the upperside, but broader and less sharply defined. The chestnut ground colour is finely streaked with transverse brown lines. On the underside of the hind wing, the base is tinged with lilac.

The antennae, head, thorax and abdomen are black above; below, the thorax is greyish and the abdomen pale ochraceous.

Expanse: 40 - 50 mm.

Range: South Indian, Himalayas, and in fact, throughout continental India, Assam and Burma, and extending also into the Malay Peninsula. The race from Ceylon is designated as *sinuata* Moore.

Habits: This is a widely distributed species, most frequently met with in thickly forested areas at low elevations. On the plains, they are rather scarce, but in the hills of South India they occur up to an altitude of 7000 feet, though in North India, they are confined to much lower elevations. The flight of this species is much weaker than that of other species of the genus. They fly close to the ground, often settling on the ground.

Genus **Cyrestis** Boisduval.

The Map Butterflies.

This genus includes the so called Map butterflies, with the wings prettily ornamented with complicated, map-like markings.

♂ ♀ : The upperside is white, with the veins black and both wings transversely marked by fine, black lines. The forewing is broadly triangular, with the costa slightly arched and the apex rather bluntly pointed. The termen is straight and the tornus obliquely truncated. The dorsum is slightly sinuous. The cell is short, less than half the length of the wing. The hind wing is irregularly triangular, with the costa very slightly arched, and the apex truncated or rounded. The termen is scallopped and produced into a well marked tail at vein 4. The tornus is elongated and produced into a broad, tornal lobe. The body is slender, and the antennal club gradually enlarged.

Of the two Indian species, only one, *Cyrestis thyodamus* which is found all over India including Southern India, is represented in the collection by the typical Indian race, *indica* Evans. The other species, C. *cocles* is confined to Northern India (Bihar, Orissa, Sikkim, Assam) and Burma.

Cyrestis thyodamus indica Evans.

The Common Map Butterfly.

Plate XX, fig 1.

Specimens in the collection: Four, one from Wynaad, one from Pulneys, one from Coorg and one from Netterikkal Rigion, Kalakkad Forest, Tirunelveli District (collected by Prof. Barnes). They all belong to the typical form designated as race *indica* Evans, to distinguish it from the race found in the Andamans *(andamanica* Wood-Mason); 61 mm. The largest specimen in the collection, (67 mm.) is 7 mm. larger than the maximum recorded expanse.

Description : ♂ ♀ : The upperside is white, with the veins black. The wings are of irregular outline, the upperside of both wings being traversed by fine, black lines which resemble map-like markings to which the species owes its popular name. On the forewing, the base, apex, terminal border and costal area are marked with greyish brown markings, and the tornal area bears a tawny yellow spot bearing two minute black spots. The post-discal transverse fine line broadens posteriorly into a darker, bluish grey band. The hind wing bears a bluish grey post-discal band bordered on both sides by dark lines. Two parallel, fine brown lines extend from interspace to the tornus and a dark brown line extends from the apex of the hind wing to interspace 4. Ther termen is scallopped and produced into a well marked tail at the apex of vein 4. The tornal area, the dorsum and the tornal lobe are rich yellow with brownish and bluish grey marking. The underside is marked more or less as the upperside, but paler. The females are larger and more yellowish.

Expanse: 50 - 60 mm.

Range: All over continental India (except in the hot dry plains of Central and North India), Himalayas, from as far west as Kashmir; Assam and Burma; Western Ghats, Travancore, Coorg, Wynaad, Nilgiris and Pulney Hills. Extending east to China and Japan.

Habits: This is a well known and widely distributed species of the genus, easily, recognized by its characteristic map-like markings. Its flight is rather weak and irregular and is often jerky and erratic. When at rest, with its wings pressed flat against the under surface of leaves, it harmonises well with its surroundings and thus escapes notice. This species often settles on damp patches of sand and frequents the vicinity of streams and nullahs.

Genus **Hypolimnas** Hübner.

This genus includes bright coloured butterflies popularly known as the Eggflies. There is considerable individual variation. Some species mimic species of Danaids very closely. On of the most striking features of this genus is the remarkable difference in colour and colour patterns between the male and the female.

♂ ♀ : In the forewing the costa is well arched. The apex is broadly rounded and the termen is slightly concave. The dorsum is straight. The cell is rather short and closed. The hind wing is very broadly ovate, with the costa arched and the termen convexly curved and scallopped. The dorsum is also arched but slightly excavated above the tornus. The antenna is rather short, but with a well developed and gradually enlarged club.

Only two species are recorded in India, although more species have been found in the Australo-Malayan Region. Both the Indian species are represented in the Museum collection. These two species are very common and are distributed over a wide range. The Danaid Eggfly (*H.missipus*) is the species that is more commonly met with in the open

plains. The males fly fast and are often found visiting flowers; they love to bask in the sunshine.

Hypolimnas bolina (Linnaeus)

The Great Eggfly.

Plate XX, figs. 2 & 3.

Specimens in the collection: Four, males; Madras and Bangalore; four females; Madras and Nilgiris. The males are strikingly different from the females; 90 mm.

Description : ♂ *:* The upperside is black. On the forewing there is an oval iridescent blue patch on th discal area, centred with white and traversed transversely by the black veins. There is also a small, pre-apical white patch traversed prominently by a black vein and a post-discal series of minute white dots. On the upperside of the hind wing, there is a central, large, oval, iridescent blue patch with a broad white centre and a post-discal series of minute white dots.

The underside is brown, but there is no prominent black costal spot. On the underside of the forewing there are a few small white spots above the cell and an oblique discal series of oval white spots. There are also two pre-apical white spots and below them a series of minute white spots in a curved row on the outer side of which are a double row of subterminal lunate white spots. The underside of the hind wing bears a fairly broad white discal band, and a post-discal series of minute white spots. An inner subterminal pale white band, and outside this, a wavy dark line with a subterminal narrow white line are also present.

♀ : The upperside is dark brown, but paler brown towards the outer margin. There is an outer discal row of small pale yellow or white spots on both wings. On the upperside of the forewing there are a few bright blue spots along the upper margin of the cell and on the costal margin. A post-discal series of white spots are present followed by a subterminal series of white markings and an outer series of white lunulate streaks. On the upperside of the hind wing, there is a post-discal series of white spots followed by a series of broad, D-shaped contiguous white marks and beyond this, an outer subterminal series of white lunulate streaks.

The underside is dull brown; in the forewing there are three small greyish spots within the cell and the discal band is dull white. The terminal markings on both the wings are as on the upperside, but the hind wing bears, in addition, a faint, greyish white discal band. In the female of the dry season form this band may be entirely absent. The female is a mimic of the crow Butterfly, *Euploea core core*, but may be readily distinguished from the latter by the broader wings and the concave termen of the forewing and the scallopped margin of the hind wing.

Expanse : 70 - 110 mm.

Range: Throughout India, Burma and Ceylon, and extending to the Malayan subregion and to Australia.

Habits : This is very common species abundantly represented in the wetter and more densely wooded parts of India. It is particularly common during the monsoon. It is widely distributed and is found occurring throughout the plains and up to an elevation of 5000 feet in the hills.

The males are very prettily marked and fly very activery in bright sunshine chasing other butterflies, and often basking with wings spread out in the sunshine. The female flies more slowly than the male and is generally found close to the ground among bushes in forests, groves and gardens. The females are seen as frequently as the males. The food plants of this species are low growing bushes of the family Utricaceae.

Hypolimnas missipus (Linnaeus).

The Danaid Eggfly.

Plate XX, figs. 4 & 5.

Specimens in the collection : Five, three males and two females; Madras and Nilgiris; 80 mm.

Description : ♂ : The upperside is black. The upperside of the forewing bears a white, transversely oval discal patch, and a pre-apical smaller spot, transversely elongated. Both spots are surrounded by dark iridescent bluish borders. the hind wing bears a much larger and more rounded white spots, similarly surrounded by an iridescent blue border, and a few minute, pale blue specks at the tornus. The ciliary fringe of both the wings at the margin is alternately marked white and black.

On the underside of the forewing, the white spots are as on the upperside; the large discal spot is bordered by a black line. The cell bears three small white spots surrounded by black margins. The base of the wing is dark reddish brown, but the rest of the wing is paler brown. Towards the terminal border, there is a post-discal series of minute white spots and outside this, a double row of marginal lunulate streaks. The underside of the hind wing is reddish brown, with a very broad white discal band bearing a transverse black streak at the lower end and a squarish black spot on the costal margin at the base of interspace 7. A post-discal series of small, widely set white spots, and beyond this a subterminal series of paired white spots and a terminal double row of lunules are also present.

The body is black above and spotted with white below.

♀ : These are polymorphic, at least three forms being recognized, and these mimic various species of *Danais*. The typical form very closely mimics *Danais chrysippus* from which it may be distinguished by the margin of the hind wing being more wavy and the upperside of the hind wing bearing a prominent black costal spot in interspace 7 instead

PLATE XX

Fig. 1. *Cyrestis thyodamas indica* Evans (x $^3/_4$).

" 2. *Hypolimnas bolina* (Linnaeus) (male, x $^3/_4$).

" 3. *Hypolimnas bolina* (Linnaeus) (female, x $^3/_4$).

" 4. *Hypolimnas missipus* (Linnaeus) (male, x $^3/_4$).

" 5. *Hypolimnas missipus* (Linnaeus) (female, x $^3/_4$).

" 6. *Kallima inachus* (Boisduval) (dorsal view, x $^3/_4$).

" 7. *Kallima inachus* (Boisduval) (ventral view, x $^3/_4$).

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of the three or four discal spots as in *Danais chrysippus*. The upperside is a rich tawny yellow and the underside is paler tawny yellow. On the forewing, the costa, apical area and the termen are black, the remaining area being a rich reddish brown. An oblique band of transversely elongate white spots and a sub-apical series of three or four much smaller white spots are present. The terminal margin bears a double row of slender, white lunulate markings. The upperside of the hind wing is reddish brown with a dusky black mark in interspace 7 and the terminal margin is black, marked with a double row of paired lunulate white markings, the inner markings of this series being somewhat obscure.

The underside is paler, but the markings are much the same as on the upperside. On the underside of the forewing four white spots are present just below the costa; on the underside of the hind wing a black spot is present at the end of the cell. It is this typical form that is represented in the collection by two specimens. The other two forms of the female are very rare.

Expanse : 70 - 85 mm.

Range : Throughout India, Burma and Ceylon, and even extending to the Malayan subregion and China.

Habits : The males of this species are more commonly seen. They fly much closer to the ground and settle frequently on trees. In the Nilgiris they are abundant in the vicinity of Cypress trees. The females mimic *Danais chrysippus* very strikingly. This species is common in the wetter part of the country especially during the monsoon. They are found up to an elevation of 7000 feet in the hills of South India. In the Himalayas they extend up to an altitude of 6000 feet, but are not common above 4,500 feet.

Genus **Kallima** Doubleday.

This genus includes the butterflies popularly known as the Oak Leaf and Dead Leaf butterfles. The forewing is broadly triangular, the costa being broadly arched and the termen oblique and broadly concavely excavated above. The apex is acute and often produced. The dorsum is slightly concave. The hind wing is larger, more elongately triangular, with a broadly rounded termen, and obtusely angulated apex. The tornus is produced into a long, bluntly pointed tail. The dorsum is concavely excavated just above the tornal tail. The basal portion of the dorsum forms a broad fold, overlapping the abdomen. The antenna is short, with a long, gradually enlarged club. The head, thorax and abdomen are dull brown.

The underside of the wings of these butterflies are dull coloured and brownish, resembling dry, dead leaves which these butterflies mimic remarkably well when they sit with their wings closed over their backs, exposing the underside of their wings.

Two species, *Kallima inachus and Kallima philarchus* are represented in the collection. The former is the Orange Oak Leaf or Dead Leaf butterfly found all over India from the Himalayas as far south as the Godavari while the Blue Oak Leaf, is confined to South India and Ceylon.

Kallima inachus (Boisduval).

The Orage Oak Leaf.

Plate XX. figs. 6 & 7.

Specimens in the collection: Three . Eastern Ghats; but their exact locality is not recorded; 90 mm.

Description: ♂ ♀ : The upperside is dark violet blue with an orange discal band and a broad, black apical area on the forewing. A hyaline spot surrounded with black is present in the middle of interspace 2. The hind wing is more or less uniform purplish, the terminal border bearing an undulated black line.

The underside shows a remarkable resemblance to a dry leaf. There is, however, considerable variation. The wings are mottled with brown and dusted with dark scales. On the underside, there is a prominent dark brown line running continuously from the apex of the forewing to the apex of the tail, remarkably simulating the midrib of a dead leaf.

The apex of the forewing and the tornus of the hind wing are narrowly produced to simulate the tip and stem of the dead leaf. This feature is more well marked in the female and in the dry season form.

The female is larger than the male, and generally of a more reddish shade on the underside.

The above is a description of the dry season form which is the typical form. The wet season form is very similar to the above, but is darker and smaller.

Expanse : 85 - 110 mm.

Range : Throughout the Himalayas, as far west as Kashmir at low elevations; Assam, Orissa, Eastern Ghats as far south as the River Godavari. Also in South Bihar and Pachmarhi.

Habits : This species is found in regions of heavy rainfall and at moderately low elevations in wooded, hilly regions. In the Himalayas, it ascends up to 8000 feet. Its flight is rapid, but somewhat unsteady. It flies only short distances and settles down frequently on trees and bushes. They are found most of the time sitting on leaves or among bushes with the wings closed over their back. In this positon, it is very difficult to detect them on account of their remarkable protective colouration. They are attracted to fruit juices, toddy and tree sap. When they fly, the orange band on the upperside of their forewings makes them very conspicuous.

PLATE XXI

PLATE XXI

Fig. 1. *Kallima philarchus* (Westwood) (x $^3/_4$).

" 2. *Precis hierta hierta* Fabricius (male, natural size).

" 3. *Precis hierta hierta* Fabricius (female, natural size).

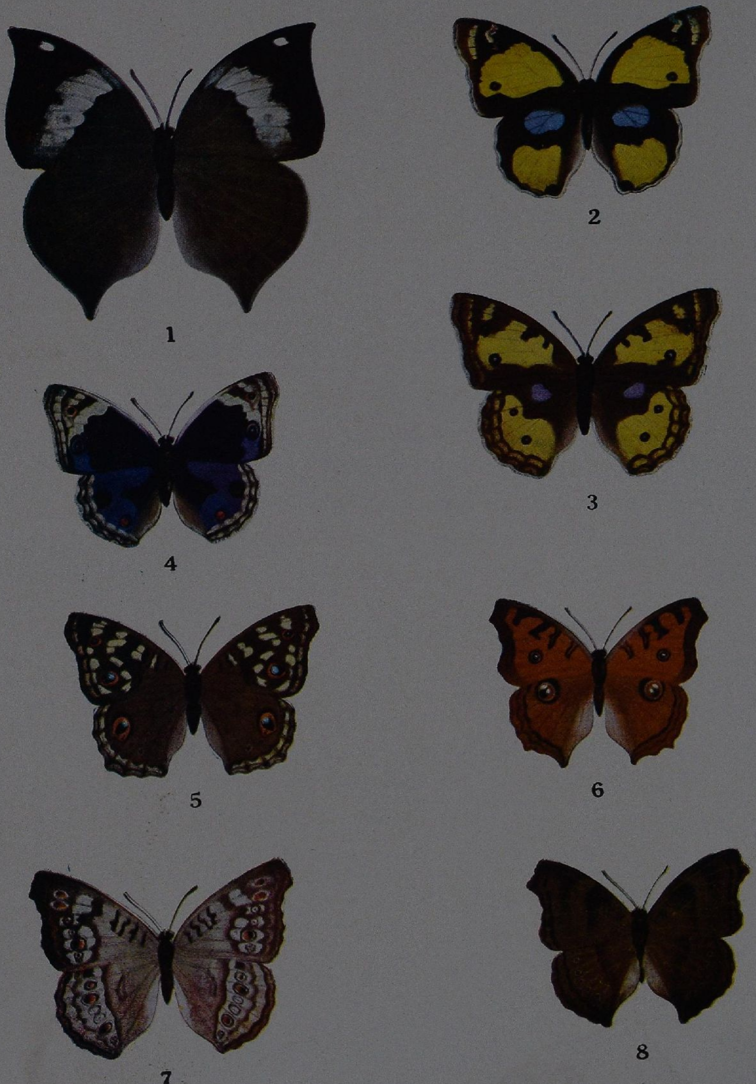
" 4. *Precis orithya swinhoei* Butler (natural size).

" 5. *Precis lemonias vaisya* Fruhstorfer (x $^3/_4$).

" 6. *Precis almana almana* (Linnaeus) (x $^3/_4$).

" 7. *Precis atlites* (Johanssen) (x $^3/_4$).

" 8. *Precis iphita pluviatilis* Fruhstorfer (x $^3/_4$).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Kallima philarchus (Westwood).

The Blue Oak Leaf.

Plate XXI, fig I.

Specimens in the collection : One, Nilgiris; 90 mm.

Description: The single specimen in the collection is labelled "*Kallima philarchus horsfieldi*". But the name *horsfieldi* is a synonym or *philarchus* Westwood, and not a separate race of *philarchus*. The present species is described under the name *Kallima horsfieldi* Kollar by Bingham in his volume on Burtterflies in the Fauna of India series, and by Antram in his "Butterflies of India".

Description : ♂ ♀ : This species is very similar in the shape of its wings and colour markings to the preceding species. The upperside is indigo-bluish, but faded to a dull dark brown in the present specimen. The forewing bears a broad, pale blue discal band which becomes whiter and brighter anteriorly. Above this, the apical area is black with a prominent pre-apical white spot. A small translucent white spot is present in interspace 3. The upperside of the hind wing is uniformly dark ochraceous brown. The costal and apical margins and the abdominal fold are paler brown, dusted with dark scales. Both fore and hind wings bear a dark brown subterminal zigzag line. The underside is as in the preceding species closely resembling a dry leaf. The resemblance to the dead leaf is greater in the dry season form to which the above description relates.

In the wet-season form, the pale discal band on the forewing is uniformly pale blue, and does not become white anteriorly.

Expanse : 85 - 113 mm.

Range : Ceylon and South India; south of Bombay, in Western India.

Habits : The habits of this species are very similar to those of the preceding species. It is confined to the Nilgiris and western side of South India, south of Bombay. It frequents hills and wooded regions at low elevations. The food plants of this butterfly are species of *Strobilanthus*.

Genus **Precis** Moore

(Synonym: **Junonia** HÜbner).

This genus includes some of the most prettily ornamented butterflies popularly known as the Pansies. They are moderately small and are of varied colours, blue, yellow and brown often predominating. A characteristic feature is the presence of eye-like spots (ocelli) on the outer discal area of both the wings.

♂ ♀ : On the forewing, the costa is moderately arched with the apex somewhat obtusely angular. The termen is straight above, strongly concave in the middle and

obliquely angulte below. The dorsum is straight and the tornus rounded. On the hind wing, the costa is widely arched and the apex rounded. The termen is broadly rounded and slightly scallopped. The tornus is slightly produced into a beak-like projection. The cell is open in both the wings. The antennae are short, being about half the length of the forewing, with the club flattened and abruptly enlarged.

The species included in this genus are subjet to considerable variation. They are among the most abundant of Indian butterflies. They are found in all types of country, except at high elevaions in the hills. Their flight is powerful and fast, often close to the ground, and consists of a few quick strokes of the wings followed by a glide, with the wings held horizontally.

The Museum collection of butterflies of this genus is very complete and representative. About six species are known in India, and all these are represented in the collection.

Precis hierta hierta (Fabricius).

The Yellow pansy

Plate XXI, figs 2 & 3.

Specimens in the collection: Seven, Pulneys, nilgiris and Madras; 49 mm.

Description : ♂ ♀ : The upperside is bright yellow. On the forewing, the costa, the apex, dorsum and tornal area are dark brown. The apex is almost black, bearing two transverse, yellow, pre-apical markings. The costa and termen are narrowly bordered with black. Post-discal ocelli are present in interspaces 2 and 5. These are conspicuous in the female, but often absent or faintly marked in the male. The upperside of the hind wing is yellow, with the base, apex and costal areas broadly black. The black basal area bears a large prominent oval glossy bright blue patch in the centre. The size of the patch is variable. The terminal border bears three parallel, somewhat undulated, fine black lines. Sometimes, small, pale discal ocelli are present in interspaces 2 and 5, but they may be reduced or absent. On the underside the forewing is pale yellow with its cell traversed by a fine black line. A short black bar is also present in front of the apex of the cell. The underside of the hind wing is greyish, with a discal, undulating brown band and a subterminal wavy brown line. The post-discal spots are minute and sometimes absent. In the female, the colours are, on the whole, duller on the upperside, but more mottled with brown on the underside.

Expanse : 45 - 60 mm.

Range : Throughout India, Burma and Ceylon. The present race, *hierta*, is the Southern race.

Habits : These are very common butterflies found practically every where. This and the next species are perhaps the most abundant and prettily marked of all Indian butterflies. They are most common on the plains, in dry regions and at low elevations.

They frequent hot and sunny place such as open river beds and dry waste land; they also frequently settle on flowers in gardens. They are very active and wary insects, and hence difficult to catch. They become rarer in forests and on the hills at higher elevations.

Precis orithya swinhoei Butler.

The Blue Pansy.

Plate XXI, fig. 4.

Specimens in the collection: Twelve, Madras, Trivandrum, Nilgiris, Mysore and Bangalore; 40.5 mm. The smallest specimen (35 mm.) is 5 mm. smaller than the minimum recorded expanse.

Description : ♂ ♀ : On the upperside of the forewing the basal two-third is jet black: the apical area is pale brown with an oblique discal white band and a post-discal white band interrupted by a black ocellus, encircled by yellow. Another yellow-ringed black ocellus with a blue centre is present below this. The tornal area is bright glossy blue. The hind wing is bright blue, shaded with black at the base. The terminal border is white with three close set wavy, fine black lines. There are two ocelli, a large white-centred and black-ringed ocellus in interspace 2 and a smaller, white-centred black ocellus in interspace 5; the latter may sometimes be absent.

The underside is much duller and is of a dull greyish brown colour. On the underside of the forewing, the cell area is traversed by three black-edged, broad, orange-yellow bands, with a broad, pale band beyond, bordered by a blackish line. The underside of the hind wing is mottled with white and brown. A fine, undulated discal transverse line, and a post-discal broad, brown band with a series of faintly marked spots are present.

♀ : This is similar, but larger and with the ocelli more prominent and clearly defined. In the female, the whole basal area on the upperside of the hind wing is black. This species is subject to considerable seasonal variation.

Expanse : 40 - 60 mm.

Range: The range of the whole species is throughout India, and Ceylon, and also extending to China and the Malayan subregion, but the present race, *swinhoei* is the South Indian race.

Habits : This is one of the commonest and most prettily ornamented of Indian butterflies. Its habits are more or less similar to those of the preceding species.

Precis lemonias vaisya Fruhstorfer.

The Lemon Pansy.

Plate XXI, fig. 5.

Specimens in the collection : Three, one from Madras, one from Nilgiris and one from Trichur; 52 mm.

Description : ♂ ♀ : The underside is dark olive brown. On the forewing, the cell is traversed by four short, black undulating lines. There are scattered, lemon-yellowish-white spots disposed more or less in the form of a curved series of discal spots and a post-discal series of spots, more straight, and a subterminal row of yellowish white spots. A large, blue-centred, yellow-ringed black ocellus is present in interspace 2 and a much smaller brown ocellus in interspace 5. The hind wing is paler brown, with a narrow, lunulated mark at the apex of the cell. A large ocellus similar to the one on the forewing is present in interspace 5, sometimes with an outer ring enclosing a very small secondary ocellus; this feature is seen in one of the three specimens in the collection. In interspace 2, below, there is a small, inconspicuous, blue-centred brown ocellus. Towards the terminal margin of the wing there are parallel, post-discal, subterminal and terminal dark brown undulated lines.

The underside is yellowish brown, with the wings somewhat mottled and traversed by undulating bands. The underside of the forewing bears a large, black ocellus encircled with a pale ring, and that of the hind wing sometimes bears a series of spots in the post-discal dark band. The present race, *vaisy* a Fruhstorfer, is the South Indian form.

Expanse : 45 - 60 mm.

Range : The range of the species as a whole extends over the Himalayas, Assam, Bengal and throughout India. Also Burma and Ceylon. The present race, however, is confined to South India.

Habits : This species can be easily recognized by the numerous lemon yellow spots on the forewing (upperside). It is more commonly found in wooded localities, and in the hills it is found up to an altitude of 8000 feet. It is common in gardens where they frequently visit flowers.

Precis almana almana (Linnaeus).

The Peacock Pansy.

Plate XXI, fig. 6.

Specimens in the collection : Eight, Nilgiris, Trichur, Bangalore and Godavari 55 mm. One of the specimens is incomplete, with the right forewing mutilated.

Description : ♂ ♀ : The upperside is orange-yellow or light tawny brown. On the upperside of the forewing, the cell and the costal area beyond (near the apex of the wing) are crossed by four short dark bands,the innermost of which is strictly in the form of a double band. A prominent ocellus with a pale centre and two black rings is present in interspace2. There are also two small pre-apical ocelli, merging with the foremost of the dark transverse bands in the costal area. There is an inner and outer subterminal and a terminal dark brown line. The termen is oblique above, deeply concave in the middle and again obliquely truncated towards the tornal angle, i.e.,the forewing is falcate and produced. On the hind wing, there is a very large pale yellow ocellus with a black ring,

occupying interspaces 4, 5 and 6. The centre of this ocellus is reddish brown towards the inside, with two small white spots, and blackish towards the outside. There is also a small, black-ringed ocellus below this in interspace 2. The terminal lines are as on the upperside of the forewing. The hind wing bears a distinct, tail-like protruberence at the tornus.

The underside is pale yellowish with very variable markings and is remarkably leaf-like in appearance. The markings are more or less as on the upper surface, but much paler, The ocelli are smaller and paler. The ocellus in interspace 5 on the underside of the hind wing is much smaller than the corresponding large ocellus on the upperside, and its ring encloses a much smaller ocellus immediately above it. The body is brown above and yellowish beneath.

The above description pertains to the dry season form to which the specimens in the collection belong. In the wet season form, the forewing is not produced and the hind wing is also not tailed at the tornus. The underside of the wings is also more prominently ocellated and not leaf-like as in the dry season form.

Expanse : 60 - 65 mm.

Range : The range of the species as a whole extends throughout India, Ceylon and Burma, The present race is the typical southern form found in South India.

Habits : This is an extremely common species, with great seasonal variation. The difference between the various extreme seasonal forms is so great that formerly they were treated as distinct species. The dry season form harmonises very well with its surroundings when it settles among dry, fallen leaves with the underside of the wings exposed. This species is most common on the plains but ascends the hills to an altitude of 4000 feet. It is particularly common in gardens among flowers.

Precis atlites (Johanssen).

The Grey Pansy.

Plate XXI, fig. 7.

Specimens in the collection : Five, Cochin, Wynaad and Trichur; 62.5 mm.

Description : ♂ ♀ : The upperside is pale grey or lavender brown with dark greyish brown markings. On the forewing, the cell bears three transverse undulating slender lines. Beyond the apex of the cell there is a similar, broader and more well marked band. A discal, wavy band is present, beyond which there is a complete post-discal series of ocelli. The ocellus in interspace 2 is the largest, and this and one or two of the ocelli towards the apex are orange-yellow towards the inside and black towards the outside. Subterminal and terminal pale undulating bands are present towards the margin. The hind wing is also more or less similarly marked, with a complete post-discal series of five ocelli, of which the second and the fifth are larger than the rest and are orange-yellow

towards the inside and black towards the outside. There is also a faint, loop-like mark at the apex of the cell, composed of two slender, curved, black parallel lines. The underside is paler, with markings more or less as on the upper surface, but very faintly marked. The females are larger, with the markings larger, heavier and more distinct. The body is grey above and white below.

Expanse : 55 - 65 mm.

Range : North East India and along the foot of the Himalayas, Bengal, Assam and Sikkim. Also in the wetter parts of the Central and Peninsular India, Burma and Ceylon.

Habits : This is the least common among the species of the genus *Precis*. This species is confined to regions of heavy rainfall and occurs at low elevations, along foothills and around marshy places and paddy fields.. It is locally common in certain localities on the West Coast.

Precis iphita pluviatilis Fruhstorfer

The Chocolate Pansy.

Plate XXI, fig. 8.

Specimens in the collection : Ten, Cochin, Pulneys and Madras; 58 mm.

Description : ♂ ♀ : The upperside is brown, with obscure, transverse markings of a darker brown shade. On the forewing, the cell bears two loop-like markings, and beyond these, there is a short, broad, oblique dark brown band continued below as a narrow discal band. A very faintly marked post-discal band bearing one or more very indistinct ocelli, and beyond this, a narrow dark brown subterminal line are present. The terminal border is dark. The upperside of the hind wing bears an obscure loop at the apex of the cell, a short discal obscure band, and a post-discal series of black-centred yellowish ocelli. Beyond these there are two undulating dark lines towards the terminal border. The apex of the forewing and the tornus of the hind wing are slightly produced; the termen of the forewing is concave below the short,straight oblique portion towards the apex. The underside is brown with very broad dark brown transverse markings,the spaces between the markings being shaded with purplish white; the appearance of the underside is more or less leaf-like, although much darker than that of the typical dead-leaf butterflies. The ocelli are obscure. Beyond these there is a zig-zag post-discal dark brown line followed by obscure terminal and subterminal lines. Almost all the specimens in the collection bear a small pre-apical white speck on the upperside of the forewing. The antennae, head, thorax and abdomen are dark brown.

Expanse : 50 - 80 mm.

Range : The range of the species, as a whole, extends throughout India, and over the Himalayas as far west as Kashmir; Ceylon. The present race, *pluviatilis* Fruhstorfer, is the Southern race, confined to South India and Ceylon.

Habits : This is one of the most dark coloured species of the genus and may be easily recognized by its more or less uniform dark brown colour. It also attains a larger size than most other members of the genus. It is not usually found on the plains, but is very common in the more thickly wooded parts of the hills having plenty of rainfall. It loves shady places and may be often found settling on damp patches of leaves or among low vegetation. The food plants are species of *Strobilanthus.*

Genus **Vanessa** Fabricius.

This genus includes medium-sized butterflies with brightly coloured wings, popularly known as the Admirals and Tortoise-shells. The upperside is generally black or dark brown with an oblique orange-red band across the forewing, or deep indigo-black with bluish band or reddish brown with black spots. The underside is much duller and protectively coloured. The margins of the wings are uneven in many species, the termen being irregularly concave, the apex of the forewing produced and the hind wing produced into a tooth-like projection at the termination of vein 4.

♂ ♀ : On the forewing, the costa is slightly arched and the apex is either rounded or produced; The termen is more or less scallopped. The tornus is rounded. The cell is rather short, being about half the length of the forewing. The hind wing is more or less triangular, but sometimes irregular in outline. The costa merges with the termen in an even curve. The antennae have short, broad, abruptly enlarged clubs. The forelegs are thickly covered with hair.

These butterflies frequent open, thinly forested country and may often be seen flying about unsteadily in the sunshine. Their flight is irregular and jerky, and when they settle in the ground, as they do frequently, they open and close their wings alternately. They visit flowers in the gardens regularly.

About a dozen species are known in India, but of these only three are known from South India, All these three, and in addition two rare species, one from Baluchistan and the other from the Himalayas, are represented in the Museum collection.

Vanessa cardui Linnaeus.

The Painted Lady.

Plate XXII, fig. 1.

Specimens in the collection : Five, Mysore, Godavary, Pulneys and Madras; 58 mm.

Description : ♂ ♀ : The upperside of the wings is reddish with dark brown markings. The base of the forewing is dusky black, dusted with golden-coloured scales. The apical area of the forewing is dark brown and bears a short white bar extending half way down from the costa and also a series of pre-apical white spots. The upperside of the hind wing bears a series of post-discal, rounded dark brown spots and a subterminal series of much smaller, linear, dark brown spots. The terminations of the veins are marked by a dark spot. The hind wing is covered with long, silky hairs at the base.

On the underside, the forewing is paler, with the terminal margin bearing white lines and the hind wing mottled with dark brown and ochraceous markings, and bearing a post-discal series of blue-centred ocelli with black rings. These are followed by a series of grey lunulate markings towards the terminal border.

The antennae are brown, yellowish towards the apex, and the head, thorax and abdomen are ochraceous.

Expanse : 55 - 70 mm.

Range : Throughout India, Burma and Ceylon. In fact, it is world-wide in distribution.

Habits : This is one of the commonest and most widely distributed species of the genus *Vanessa*. Butterflies of this species undertake mass migrations and fly long distances, in great swarms. This, and the wide range of variety in their food plants account for their cosmopolitan distribution. This species frequents open places, gardens and cultivated fields. Its flight is fairly strong and rapid, though rather unsteady and erratic. They frequently settle on the ground with the wings closed and with the markings on the hind wing protectively harmonizing with the surroundings. Sometimes, as when feeding on flowers, the wings are alternately half closed and opened.

Vanessa indica pholae Fruhstorfer.

The Indian Red Admiral.

Plate XXII, fig. 2.

Specimens in the collection: Two, one from Pulneys, and the other from Coorg; 46 mm.

Description: This species resembles the preceding species in general appearance, but the ground colour is darker, with the orange markings much richer and darker in tone.

♂ ♀ : The upperside is dusky black; the forewing bears an orange-red discal band from costa to vein 1 at the tornal angle. On the dark apical area, there are three white spots and beyond this a series of minute pre-apical white spots. The orange area below the dark apical area bears three large quadrate black spots. The upperside of the hind wing is uniformly dusky brown with a narrow orange red broder towards the termen, bearing a series of black spots in the interspaces. The inner edge of this orange red border is margined with black, crescent-shaped marks. On the underside of the forewing, the markings are the same as on the upperside, but paler. The underside of the hind wing is mottled with dark brown, and the dark markings towards the base are outlined with silvery grey lines. A post-discal series of obscure, blue-centred dark ocelli and a series of blue lunules on the terminal border, with a fine line on the outer side, are also present.

Expanse : 55 - 65 mm.

Range : The range of the species, as a whole, extends throughout India, hills of South India, Coorg, Himalayas as far west as Kashmir, North East India, North Burma and Ceylon. But the present race, *pholae* Fruhstorfer, is the South Indian race.

Habits: This species is one of the commonest species of *Vanessa*, inhabiting forest as well as open country. It frequently settles on the ground with the wings half open much in the same way as the preceding species. It is frequently attracted to flowers and overripe fruit. The species *Vanessa indica* is represented at moderate elevations in the Himalayas as well as in the hills of Ceylon and South India, but as mentioned above, the race *pholae* to which the specimens in the collection belong, is confined to South India.

Vanessa atalanta Linnaeus.

The Red Admiral.

Plate XXII, fig. 3.

Specimens in the collection : Two, probably from Baluchistan, 62 mm.

Description : This species is very rare and is a European species, known only from Baluchistan in the Indian Region. It is very similar to the preceding species, but differs from it in the red, oblique band on the upperside of the forewing being narrower and not broken up. The terminal orange-red border on the upperside of the hind wing is also slightly broader than in the preceding species.

Expanse : 55-65 mm.

Vanessa canace viridis Evans.

The Blue Admiral.

Plate XXII, fig. 4.

Specimens in the collection: Four, South Coorg and Nilgiris, 60 mm.

Description : ♂ ♀ : The upperside is dark indigo-blue. The upperside of both the wings bears a broad, pale blue post-discal band. In the forewing this band tapers and curves outwards towards the apex, while in the hind wing this band is comparatively broader and bears a series of black spots along its outer border. On the forewing, a short, oblique broad blue bar is present beyond the apex of the cell. The terminal border in both wings bears an undulating black line. In the female, the post-discal band is broader than in the male.

The underside is brownish black. The basal half is very dark, and this area is defined outwardly by a wavy black line. The terminal areas of the wings are paler. The apex of the forewing is pale brown, and below, this pale brown area is continued as a broad, irregular discal band to the dorsum. The whole of the under surface is mottled and marked densely with dark, fine streaks. A small creamy yellow spot is present at the apex

of the cell in both the wings and along the dorsum near the tornal angle of the forewing. The terminal margin is rather irregular and presents a somewhat scallopped appearance. The terminal margin of the wing is deeply excavated and that of the hind wing is produced into a prominent tail-like projection about its middle. The antennae and the abdomen are black and the head and the thorax dark blue.

Expanse : 60 - 75 mm.

Range : The range of the species *Vanessa canace* extends over the Himalayas, Assam, Sikkim, hills of North East India, Burma, Ceylon, Southern India and the hills of Coorg. But the present race *viridis* Evans is the Southern race confined to South India.

Habits : This species frequents well wooded localities in hilly districts of the country. It is usually found near streams and rivulets. These butterflies generally settle on damp patches of ground and on rocks and stones with the wings half closed. They are also attracted to tree sap, flowers and ripe fruits. Butterflies of the species *V. Canace* are found throughout the year except in the Himalayas where they do not occur in the winter. Members of the present race, *viridis* Evans, are confined to the hills of Coorg and Southern India in general, where they are generally found above an altitude of 4000 feet.

Vanessa C-album cognata Moore.

The C-Marked Admiral

Plate XXII, figs 5 & 6.

Specimens in the collection : Three; 50 mm. Their exact locality is unfortunately not recorded. The wing expanse of these specimens is 8 mm. Smaller than the minimum recorded expanse for this species.

Description : ♂ ♀ : The upperside is dark yellowish red, with a complicated pattern of black markings. On the forewing, the cell bears two spots and there is a black band beyond the apex of the cell. There is also a pre-apical band and three black spots in interspaces 1, 2 and 3. Below these spots there is a large, squarish black patch on the dorsum and a broad band along the termen. Within the broad terminal black band there is a series of obscure pale yellow spots. The upperside of the hind wing bears a black bar extending from below the middle of the costa and two black spots one each at the bases of interspaces 3 and 5. There is a post-discal transverse band, a terminal black border and in between these two there is a band of the ground colour. The terminal margin bears a series of small pale yellow spots.

The underside is dark brown, variegated with various shades of brown and dusted with fine lines and minute dots. On the underside of the hind wing there is a very characteristic, white, sharply defined, C-shaped mark below the lower apex of the cell. On both wings, on the underside, there is a post-discal series of greenish lunule-like markings in the typical form of the species, but these lunules are pink in the present

PLATE XXII

PLATE XXII

Fig. 1. *Vanessa cardui cardui* Linnaeus (x $^3/_4$).

" 2. *Vanessa indica pholae* Fruhstorfer (natural size).

" 3. *Vanessa atlanta* Linnaeus (x $^3/_4$).

" 4. *Vanessa canace viridis* Evans (x $^3/_4$).

" 5. *Vanessa C-album cognata* Moore (dorsal view, x $^3/_4$).

" 6. *Vanessa C-album cognata* Moore (ventral view, x $^3/_4$).

" 7. *Argynnis hyperbius hybrida* Evans (male, x $^3/_4$).

" 8. *Argynnis hyperbius hybrida* Evans (female, x $^3/_4$).

" 9. *Argynnis hyperbius castetsi* Oberthur (x $^2/_3$).

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variety (*cognata* Moore). The margins of both wings are shaped more or less as in the preceding species.

The above description pertains to the wet season form which is the common form.

In the dry season form, the ground colour is paler on both the upper and underside of the wings.

The specimens in the collection belong to the variety *cognata* Moore. It differs from the typical form in the two median black spots in the cell of the forewing being more or less cognate, in the terminal black margin of the hind wing being narrower and the lunule-like markings on the underside being pink instead of being greenish.

Expanse : 58-62mm.

Range : The Himalayas, from Kashmir to Kumaon.

Habits: This is a rather uncommon species confined to wooded country in the Himalayas. Its habits are more or less similar to those of the preceding species.

Genus **Argynnis** Fabricius.

This genus includes brightly coloured butterflies with black spots, known popularly as the Fritillaries. The uppersides of the wings are bright tawny yellowish with numerous rows of black spots. The underside of the hind wings bears silvery spots and crescent-shaped white markings with black edges.

The forewing bears a round apex, straight termen and widely arched costa. The dorsum is also straight. The cell is closed and slightly less than half the length of the wing. In the hind wing the apex is rounded and the costa straight except at the base where it is angular. The termen is broadly rounded and scallopped at the margin. The antennae are rather short, with short, abruptly enlarged club. Almost all the species are confined to the Himalayas and are found in Kashmir, Chitral, Kumaon, etc., at fairly high elevations. They are all essentially hill species, only one species, the Indian Fritillary, *A. hyperbius*, is found occasionally in the plains, and this is the only South Indian species. Two races of this species and two out of the numerous Himalayan species alone are represented in the Museum collection.

The habitat of these butterflies is among the grassy slopes of the Himalayan valleys where wild flowers abound. They are fond of sunshine and bask frequently gently closing and opening their wings alternately. Cases of melanism (where the markings are darkened) are occasionally met with in this group.

Argynnis hyperbius (Johanssen).

The Indian Fritillary.

Two races, *A. hyperbius hybrida* Evans, and *A. hyperbius castetsi* Oberthur, are represented in the collection. The former is the typical form common all over South India,

while the latter is a local race confined to the plains and hills of Travancore and Cochin (Pulney Hills, etc.).

Argynnis hyperbius hybrida Evans.

Plate XXII, figs. 7 & 8.

Specimens in the collection: Two; one of these is a female, from Coonoor, Nilgiris, and the other a male, the exact locality of which is not recorded; 62 mm. This is slightly smaller than the minimum recorded expanse.

Description : ♂ : The upperside is tawny orange-yellow with a pattern of black markings consisting of a basal spot, and two transverse streaks in the cell, a zig-zag series of discal spots and another series of spots in the post-discal area. There is also a fairly complete and regular series of linear, subterminal black spots followed beyond by a subterminal line and outside this by a fine terminal line; the subterminal line is rather broken up and made up of a series of transversely extended spots.

In the hind wing, the cell bears a transverse streak and a small spot at its apex. A short streak is present near the base of interspace 7. There are also a discal row of five spots and another post-discal row of five spots but these spots are somewhat smaller than those on the forewings. Finally, there is a subterminal row of somewhat elongate, elliptical black spots followed beyond by a narrow black band bordered outside by a row of lunules of the ground colour (these lunules becoming bluish posteriorly) and a terminal fine line.

On the underside of the forewing the apex is yellowish green, with a series of silvery white spots disposed in the form of an incomplete circle and two minute white spots in the centre of the area enclosed by this circle. The other markings are more or less as on the upperside. The basal area is pinkish red. The underside of the hind wing is light brown or greenish brown towards the outside but dark green towards the basal area. It is marked with silvery white and olive brown spots, some of which are bordered with sharply defined black lines. The marginal markings consist of olive brown spots bordered on the outside by white lunules, a fine, black subterminal line and finally a terminal black line.

♀ : The markings are more or less the same as in the male, except that the apical half of the forewing and the terminal border of the hind wing are purplish blue with white bands, and on the forewing, there is a prominent oblique pre-apical white band and some small bluish white spots in the dark apical area beyond. On the underside of the hind wing, the markings are darker and broader than in the male.

Expanse : 65-85 mm.

Range : This is a widely distributed species occuring in the Himalayas, North East India, Burma, Baluchistan, Ceylon, Saurashtra, Mount Abu, the Nilgiris and the hills of Southern India. It has also been specifically recorded from Lucknow and Tiruchirapalli.

Habits: This is normally a species frequenting the hills, but is occasionally found in the plains. In the Himalayas it is generally found at an altitude of 2000 to 3000 feet. In South India it is common in the hills, frequenting open country, gardens, meadows and orchards in the hill regions, above an altitude of 6000 feet. The male flies fairly rapidly, but the female is much slower and shows some resemblance to *Danais chrysippus* owing to the presence of the white oblique band on the forewing and the black markings. These butterflies settle frequently on the ground, when they open and close their wings alternately.

Argynnis hyperbius castetsi Oberthür.

The South Indian Fritillary.

Plate XXII, fig. 9.

Specimens in the collection: Three, Pulneys: 70 mm. The smallest specimen measures 62 mm., which is 4 mm. less than the minimum recorded expanse.

Description : ♂ ♀ : This race closely resembles the typical race described above, but may be readily distinguished from it by the fact that the female is without the characteristic white-banded purplish blue apex of the preceding form. It is more or less similar to the male but with a somewhat darkened apical area. In the male, the upperside is a richer and brighter orange-yellow and there is a conspicuous sex mark of specialised scales along the middle of vein 1 on the upperside of the forewing.

Expanse : 66 - 76 mm.

Range : The plains and hills of Cochin and Travancore, Pulneys, Southern India.

Habits : The habits of this race are very similar to those of the typical race described above.

Argynnis aglaia (Linnaeus)

The Kashmir Silverstripe.

Plate XXIII, fig. 1.

Specimens in the collection : Two, a male and a female; 58 mm. Their exact locality is not recorded. Both of them belong to the typical form *vitatha* Moore.

Description : ♂ ♀ : The upperside is tawny yellow, with black spots and markings, and the basal area of both the wings is somewhat darkened. The cell in the forewing bears a median loop-like mark and a short, transverse pre-apical line and another transverse line at the apex of the cell. There are also a discal zig-zag row of spots, and transverse post-discal and subterminal series of spots. A short subcostal black patch in interspace 6 and a terminal narrow black band are also present. The upperside of the hind wing bears a broad black line at the apex of its cell, and a narrow discal band which is strongly

produced and angulated outwards about the middle. Beyond this there is a post-discal series of five black spots of which the middle one is reduced, sometimes almost minute. The subterminal series of elliptical spots and the terminal narrow black band are disposed as on the forewing.

On the underside of the forewing, the ground colour is tawny brown, fading into pale yellow towards the apex and costa. The black markings are more or less as on the upperside, but those near the terminal and apical margins are greenish. On the underside of the hind wing the basal and terminal areas are suffused with green. Two basal and three transverse median silvery spots are present on the basal area, and there are also a discal series of silvery spots and a row of subterminal silvery lunule-like spots. The upperside in the female is similar, with the markings as described above, but the ground colour is paler and the basal darkened area of the wings more extensive, and on the underside the markings are as in the male, but broader, and the apical area of the forewing is tinged with green.

Expanse : 56 - 78 mm.

Range : Chitral, Kashmir, at an altitude of 15,000 feet.

Habits : This species is common at very high elevations in the mountains of North Kashmir and Chitral. These butterflies are fairly fast fliers and frequent open meadows and glades in the hill tops. Its habits, in general, are similar to those of the preceding species.

Argynnis lathonia (Linnaeus).

The Queen of Spain Fritillary.

Plate XXIII, fig. 2

Specimens in the collection : Five, but their exact localities are not recorded. Probably they are from the Sikkim area in the Himalayas; 40 mm. The specimens in the collection are 10 mm. smaller in average size than the minimum recorded expanse. The smallest specimen measures only 36 mm.

Description : ♂ ♀ : The upperside is dark yellowish orange with black markings. The basal area of the wings is shaded with dull olive brown. The disposition of the markings is more or less similar to that in the preceding species. The post-discal and subterminal rows of spots are all regular and complete.

The underside of the forewing is pale yellow with the black markings as on the upperside, but there is an oblique, inwardly widening chestnut-red patch extending downwards from the apex. On the inside of this patch is a silver-coloured spot in interspace 6, bordered on the inside with chestnut red, and on the outside there are two bright silvery spots near the margin. The underside of the hind wing is yellowish brown with very large bright glossy silvery spots separated by chestnut-red bands. There is a characteristic post-discal series of black spots centred with small silvery spots on a

chestnut-red band, and beyond these small spots there is a terminal row of large silvery spots rather irregular in size and shape. The terminal margin bears two slender chestnut red lines.

The female is similar, but the black markings on the upperside are broader and those on the underside are larger than those in the male.

Expanse : 50 - 60 mm.

Range : The Himalayas, Chitral to Sikkim; the Chin Hills, North Burma. Also Baluchistan.

Habits : This is a very common species found plentifully between elevations of 5000 and 15,000 feet in the Himalayas. It is easily distinguished from other species of this genus by the presence of the large silvery spots on the underside of the hind wing. Its flight is fairly rapid and of a peculiar zig-zagging type, mostly close to the ground. It frequents open country and often settles on the ground or on flowers with the wings partly closed. The race from Baluchistan is smaller and more reddish in colour.

Of the species of *Argynnis* represented in the collection this appears to be the smallest in size.

Genus **Atella** Doubleday.

This genus includes tawny yellow butterflies with numerous black spots, popularly known as the Leopards.

The forewing is triangular, with a rounded apex and evenly arched costa. The termen is somewhat concave in the middle. The dorsum is also sinuous. The cell is short, less than half the length of the forewing. The hind wing is broadly ovate, almost subquadrate with a slightly arched costa and rounded apex. The dorsum is convexly arched and the termen slightly scallopped. The cell is short. A transverse membranous fold is present between veins 4 and 5 beyond the apex of the cell. The antennae are long, with an abruptly enlarged club.

Only two species are known in India, and both these are represented in the collection. They are *Atella phalantha* (Drury), the Common Leopard, and *Atella alcippe* Cramer, the Small Leopard. The former, which is much the commoner of the two, may be distinguished from the latter by being larger and by the cell in the forewing bearing four dark lines, while in the latter the cell in the forewing bears five or six dark lines, excluding the bar at the end of the cell.

Atella phalantha (Drury).

The Common Leopard.

Plate XXIII. fig 3.

Specimens in the collection: Seven, Madras, Kurnool, Nilgiris and Coorg; 52 mm. Unfortunately the wings in some of these specimens are not in a good state of

preservation. The smallest specimen (46 mm.) is 4 mm. smaller than the minimum recorded expanse.

Description : ♂ ♀ : The upperside is bright tawny yellow, with rows of small black spots, somewhat as in the genus *Argynnis*. On the forewing, the cell is crossed by four short, sinuous black lines excluding the bar at the end of the cell. These are followed beyond by a series of black spots; there are also two transverse series of discal spots and a post-discal series of continuous lunules. Outside this there is a narrow subterminal line, and at the terminations of the veins a terminal series of spots.

On the hind wing, the basal area bears rows of slender, linear, rather obscure spots, followed by a discal series of four well defined spots. Beyond this, there is a continuous series of post-discal lunules, a subterminal undulating line and a final terminal row of spots at the apices of the veins as on the forewing.

The underside is paler, the markings being much the same as on the upperside, but fainter and fading into a dull reddish brown. Both the wings bear a wash of pale purple. The terminal spots of the two discal rows on the forewing are large and boldly marked. The black spot in interspace 1 b on the underside of the forewing is particularly large and prominent. There are no silvery markings on the underside. On the underside of the hind wing, the outer half is especially suffused with pale purple.

Expanse : 50 - 60 mm.

Range : Throughout India; Assam, Ceylon and Burma.

Habits : This species is widely distributed and is a common butterfly found all over continental India. It prefers to fly mostly during the dry weather when it may be found in gardens and around edges of wooded localities. It is not found during the monsoon in the wetter regions of India. This butterfly is strong in its flight and active in its movements. They are attracted to flowers and damp patches of ground where they may be seen basking in the sunlight. The food plants belong to the family Bixaceae. In the Himalayas it ascends to an elevation of 7500 feet. In South India, it may be found even high up on the hills.

Atella alcippe mercea Evans.

The Small Leopard.

Plate XXIII, fig. 4.

Specimens in the collection : One, Malabar; 42 mm. It is labelled *Atella alcippe mercea* Evans, but this appears to be synonymous with the race *ceylonica* Manders, which is Ceylon and South Indian race, as distinguished from *alcippoides* Moore, which is the Northern Indian race.

Description : ♂ ♀ : This species closely resembles the preceding one, but is smaller and the black markings are narrower and more linear. The cell on the upperside

PLATE XXIII

PLATE XXIII

Fig. 1. *Argynnis aglaia* (Linnaeus) (x $^2/_3$).

" 2. *Argynnis lathonia* (Linnaeus) (natural size).

" 3. *Atella phalanta* (Drury) (natural size).

" 4. *Atella alcippe mercea* Evans (natural size).

" 5. *Melitaea didyma* (Esper) (natural size).

" 6. *Cupha erymanthis maja* Fruhstorfer (x $^2/_3$).

" 7. *Cynthia erota saloma* Swinhoe (x $^2/_3$).

" 8. *Cirrochroa thais thais* Fruhstorfer (x $^2/_3$).

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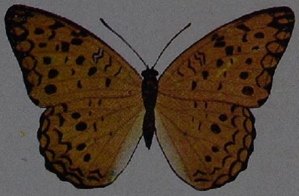

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of the forewing bears five or six dark lines, excluding the bar at the end of the cell. The terminal border is broad and black. In the South Indian race, to which the present specimen belongs, the terminal borders in both wings are broader than in the typical form, and there is a broad black apical area on the forewing in both the sexes. On the upperside of the hind wing, the basal area is traversed by a number of fine black lines, and beyond these, there is a post-discal series of spots, a broad undulating black line followed by a subterminal straighter line and a terminal narrow black band.

The underside is paler and the markings are as on the upperside, but very faint and obscure, and the post-discal, terminal and subterminal markings are dark yellowish. In the female, the markings of the upperside are broader and heavier, and on the underside also the markings are broader than in the male.

Expanse : 35 - 50 mm. But Bingham cites 54 - 59 mm. as the expanse for the race *alcippoides*.

Range : The range of the species as a whole extends over Sikkim, Assam, Burma, Malay Peninsula, Ceylon and Western Ghats, but the present race, i.e., the Ceylon and South Indian race *merce* (= *ceylonica*) is confined only to Ceylon and the Western Ghats. The single specimen from Malabar in the Museum collection belongs to this race. It shows the broad, black apical area on the upperside of the forewing distinctly.

Habits : This species is similar to the preceding one in its habits. It is extremely local in its distribution, being found restricted only to particular localities. In South India, it is found only in the Western Ghats, where it has been recorded from Coorg, North Canara and Travancore. It is found plentifully in certain localities, especially in Coorg during March and April. These butterflies often rest on the undersides of leaves.

Genus **Melitaea** Fabricius

This genus includes small butterflies popularly known as the Small Fritillaries, but all the four known Indian species are confined to Northern regions in the Himalayas such as Baluchistan, Chitral and Sikkim at high elevations. They are tawny yellow above with rows of small black spots.

♂ ♀ : The forewing has the costa slightly arched and the apex rounded. The termen is convex and the dorsum straight. The cell is closed and somewhat shorter than half the length of the wing. The hind wing is ovate with the costa and dorsum almost straight. The antennae are about half the length of the forewing, with the club abruptly enlarged. Most species are marked on the underside of the hind wing with tawny, black-edged bands on a pale ground colour. The species included in this genus are extremely variable and difficult to separate.

A single species, *Melitaea didyma* (Esper) is represented in the collection.

Melitaea didyma (Esper).

The Red-band Fritillary.

Plate XXIII, fig. 5.

Specimens in the collection : Three; 42 mm. Their exact locality is not recorded. On of them appears to belong to the race *persea* Kollar, while the other two, with a duller ground colour and heavier black markings on the upper surface may be assigned to the race *chitralensis* Moore. The following description applies to the typical form *persea* Kollar.

Description : ♂ ♀ : The upperside is dark tawny yellow, One the forewing, the cell bears a small black spot followed by transverse black lines. There is also a discal series of black spots and beyond this, a subterminal series of lunulate spots and a narrow terminal black band. On the hind wing, the base and dorsal margins are suffused with black and the markings consist of a sub-basal black band followed by a discal series of black spots, a subterminal series of lunulate spots and a terminal black band.

The underside is pale yellow, with black markings as on the upperside, but smaller. The terminal black border of the upperside is represented on the underside by a series of small black spots and a slender, marginal black line. The underside of the hind wing is pale yellowish white, with a number of small black spots at the base. There is also a sub-basal yellowish red band with a similarly coloured spot in the middle of the cell. Discal and subterminal rows of black spots, with a post-discal yellowish red band in between them are also present, followed by a terminal narrow black line.

In the race *chitralensis* (to which two of the specimens in the collection seem referable), the ground colour is duller and the black markings on the upperside are much heavier, but in this respect there is considerable seasonal variation, and in fact, in one of these specimens, the upperside of the hind wing is almost completely black, with the ground colour showing up here and there as small spots.

Expanse : 34 - 52 mm.

Range : Baluchistan, North West Frontier Province, the Punjab, Chitral.

Habits : These butterflies inhabit the higher elevations in the Himalayas frequenting dry and rocky regions. Their flight is rather weak and unsteady and they settle frequently on the ground. There is considerable variation in the colour and colour markings of this species.

Genus **Cupha** Billberg.

This genus includes bright brown butterflies popularly known as the Rustics. The forewing is broad and rounded, with a broadly arched costa and a slightly convex termen. The dorsum is slightly concavely excavated and the cell is narrowly closed. The hind wing is broadly ovate with a slightly arched costa and a convexly arched termen which is

scallopped and slightly produced at the termination of vein 4. The antennae are about half the length of the forewing with the club only slightly enlarged.

Only a single Indian species of this genus is known, namely *Cupha erymanthis*, but Bingham, in his volume on Butterflies in the Fauna of British India series, separates the South Indian and Ceylon forms into the species *Cupha placida* and states that the Southern Indian form has been separated by some as *C. maja*, although he admits that *C. placida* itself may be a race of *C. eryamanthis*. Similarly, *maja* also may at best be considered only as a race of *C. erymanthis*, and is treated thus in the present account. Specimens of the Southern Indian race, *C. erymanthis maja* alone are reprsented in the Museum collection.

Cupha erymanthis maja Fruhstorfer.

The Southern Indian Rustic.

Plate XXIII, fig. 6.

Specimens in the collection : Seven, Cochin, Coorg, Nilgiris, Pulneys and Wynaad; 55 mm. One of these (from the Nilgiris) belongs to the typical form, but the locality in this case seems to be incorrectly recorded, as the typical form occurs only in North India.

Description : ♂ ♀ : The upperside is yellowish brown. The forewing is broad and rounded and bears a broad, black, triangular apical area and a broad, bright yellow transverse discal band, extending down from the costa, and broadening posteriorly. The inner border of this yellow band is defined by a dark irregularly undulating line. Three small black spots of almost equal size are present in interspaces 1,2 and 3, but in one specimen (from the Nilgiris), these spots are larger, and the lowest of these is very large, almost in the form of a large, squarish black patch. This specimen apparently belongs to the typical form, but how it could have been labelled as 'Nilgiris' is not clear, for the South Indian forms belong only to the race *maja* in which the post-discal spots are small and approximately equal in size. In this specimen, there is also a sub-apical yellow spot in the apical area which is wanting in the other specimens (this spot being absent in the race *maja*.) The termen bears a narrow black band. The hind wing bears a number of transverse narrow black lines and beyond these there is a discal series of black spots and a row of black, lunule-like markings, followed by a second series of less curved lunules and finally a narrow terminal black band. The underside is much paler, with the apical area of the forewing marked brownish. On the underside of the forewing there is a discal chestnutbrown line with a series of dark spots on its outer border and two rows of subterminal tooth-shaped spots. The underside of the hind wing bears a series of lunule-like discal spots bordered with purple on the outside and a post-discal band and subterminal row of tooth-shaped spots. *In the present race, maja*, the bases of both wings are shaded with olive brown, and the markings on the underside are more sharply defined.

Expanse : 50 - 60 mm.

Range : The range of the species as a whole extends over Ceylon, South India, the Himalayas, Mossoorie to Assam and Burma, but the race *maja* is the Southern Indian form.

Habits : This species is restricted to hilly country where it is found in regions having heavy rainfall. It is common in the hill forests of Southern India up to an altitude of 7000 feet. Its flight is rather weak, and often close to the ground, but now and then it ascends higher and hovers around tree tops. It hides readily in the shade of the undergrowth when chased or disturbed.

Genus **Cynthia** Fabricius

This genus includes large and handsome butterflies, popularly known as the Cruisers.

♂ ♀ : In the forewing, the costa is broadly arched, with the apex produced and rounded. The termen is slightly concave. The cell is closed and slightly less than half the length of the forewing. The hind wing is broadly and irregularly ovate, almost squarish and subquadrate, the termen being produced into a conspicuous tail at vein 4 . The terminal margin both above and below this tail is slightly scallopped. The tornus is definitely angulated. The antennae are long and slender, with the club long, narrow and gradually enlarged.

Although Bingham, in his volume on Butterflies in the Fauna of British India series, mentions two different Indian species, and describes the South Indian form *(saloma)* as a race of the second species, *C. asela* , Wynter Blyth *(Butterflies of the Indian Region)* records only one Indian species, namely, *C. erota*, and includes Ceylon, South Indian, North Indian and Burmese forms in this single species. Some authors (e.g. Antram) have separated the South Indian form as a distinct species, *C. Saloma*, but it seems best to refer all the Indian forms only to one species, *C. erota*, and perhaps separate the South Indian forms only as a race of *erota*, and this is the procedure we have followed in the present paper, as the race saloma is practically identical with the typical form of S. *erota*, and does not justify separation as a distinct species. This South Indian race alone is represented in the Museum collection.

Cynthia erota saloma Swinhoe

The South Indian Cruiser.

Plate XXIII, fig. 7

Specimens in the collection: Eight, Cochin, Nilgiris, Trivandrum and Kalakkad Forest, Netterikal Region, Tirunelveli District; 96 mm. Only one of these specimens is a female, the rest are males.

Description : ♂ : The upperside is yellowish brown, with the basal and apical areas of the forewing and the terminal area of the hind wing darkened. The forewing is produced. It is tawny or yellowish brown above, with two undulating black lines on the outer dark marginal area. There is also one irregular black line across the discal area in both wings, demarcating clearly a basal darkened area from a post-discal lighter area. The forewing also bears a few black lines across the cell. On the upperside of the hind wing there is a straight inner discal transverse black line outside which is a pale yellow narrowly triangular patch. The two wavy black lines are present towards the margin as on the forewing. A black-centred ocellus is present in interspaces 2 and 5. The margin of the hind wing is produced into a tooth-like tail at the termination of vein 4.

The underside is more or less similar, but the basal half of both the wings and the markings in this area are pinkish: The underside of the forewing bears a few silvery white spots over the apical area, an inner reddish brown subterminal line and an outer subterminal pale brown line. The underside of the hind wing bears ocelli as on the upperside.

♀ : The markings are similar to those in the male, but the upperside is bluish green or dark greenish brown, with a prominent white band across the discal area. One specimen from the Nilgiris, in the collection, is a female. The basal area of both the wings on the upperside is dusted with olive green scales. The underside is paler and more brownish than in the male. The hind wing is produced into a tail at vein 4 as in the male.

The South Indian race, *saloma*, is more or less identical with the typical form, but the basal area and the terminal margins on the upperside of both wings is much darker brown and in the famale, the upperside is dark olive brown, with the black markings rather prominent.

In North East India, the seasonal forms are markedly differentiated, the dry season form being small, lightly marked and the forewing not produced, and the hindwing scarcely tailed, while the wet season form is larger, with the hind wing prominently tailed. But in the South Indian specimens, these differences are not apparent.

Expanse : 72 - 110 mm.

Range : The range of the species as a whole extends over Ceylon, Western Ghats, Nilgiris, Sikkim to Assam and Burma; the race *saloma* is confined to Southern India and Ceylon.

Habits : This is a large, handsome butterfly inhabiting the hills of Southern Indian, below an altitude of 7000 feet in thick evergreen forest. They are attracted to flowers. Their flight is fairly fast and during the hotter hours of the day, they fly high or bask on leaves high up on the trees. This is one of the most impressive among the South Indian butterflies.

Genus **Cirrochroa** Doubleday.

This genus includes butterflies of medium to fairly large size known popularly as the Yeomen. They are usually tawny above, with a black, narrow, outer margin on the forewing, and an irregular discal black line, and one or two undulating marginal black lines on both the wings.

♂ ♀ : The forewing is broadly triangular, with the apex produced and somewhat truncated. The termen is angular above and slightly concave below the angulation. The dorsum is straight and the cell short and closed. The hind wing is elongate with a slightly arched costa. The termen is arched in front but rounded behind vein 4. The dorsum is straight, but concavely excavated immediately above the tornus. The antennae are rather short with a narrow, gradually enlarged club.

Of the three species recorded from India, only a single species, C. *thais* is found in South India, and this is the only species that is represented in the collection, by the typical race, *thais* Fruhstorfer.

Cirrochroa thais thais Fruhstorfer.

The Tamil Yeoman.

Plate XXIII, fig. 8.

Specimens in the collection: Six, Trivandrum, Malabar, Pulneys, South Coorg and Cochin; 62 mm.

Description : ♂ ♀ : The upperside is bright reddish yellow. On the upperside of the forewing the apical and terminal margins are black. A transverse narrow black line is present at the apex of the cell, and beyond this, there is a series of three obliquely directed black linear spots almost forming a continuous zig-zag line. There is also a post-discal series of transverse, faint, lunulate markings, a subterminal transverse undulating band and beyond this a series of obscure lunule-like patches of the ground colour. Beyond this, there is the broad, terminal and apical black border. On the upperside of the hind wing, there is a dark transverse discal line followed by two parallel subterminal lunular wavy black lines and a final straighter, slender black line close to the terminal margin.

The underside of the wings is dull greyish brown, suffused with purple, with a prominent, transverse white discal band across both wings. This band is edged on either side with dark brown and gets gradually narrower towards the posterior side of the hind wing. There is a post-discal row of very small spots on the hind wing, and on both the wings there are faint lunular markings towards the terminal margin. In the female, generally, the black markings are broader, and on the underside the ground colour is paler and not suffused with purple.

The dry season form is similar to the above typical wet season form, but the ground colour on the upperside is duller and paler and the markings are slightly more restricted and dusky black.

Expanse : 60 - 70 mm.

Range : Ceylon and Southern India; Western Ghats. Coorg, Wynaad, Nilgiris, Cochin and Pulneys.

Habits : This species is found plentifully in the evergreen forests of the hills of Southern India and Ceylon. It is most common in South India during the months of February to May. Usually it frequents sheltered and shady places near streams and in woody country, often settling on damp patches of sand with the wings half closed. Their flight is rapid and fairly steady and powerful.

Genus **Byblia** Hübner.

This genus includes medium-sized butterflies with a bright orange ground colour, popularly known as the Jokers.

♂ ♀ : The forewing is broadly triangular with a blunt apex and slightly arched costa The termen and dorsum are straight and the cell rather short and closed, and less than half the length of the wing. The hind wing is more or less triangularly ovate, rather pear-shaped, with the costa and dorsum slightly and evenly arched, and the apex and tornus rounded. The cell is short, narrowly closed and slightly less than half the length of the wing. The termen is well rounded. The antennae are fairly short, about half the length of the wing with the club short, abruptly enlarged and flattened.

This genus includes a single Indian species *Byblia ilithyia* (Drury) which is represented in the Museum collection.

Byblia ilithia (Drury).

The Joker.

Plate XXIV, fig 1.

Specimens in the collection : Two, of which one is from Cuddappah and the other from the Nilgiris; 46 mm.

Description : ♂ ♀ : The upperside is bright tawny orange, with narrow black markings, On the forewing, the costa is black except at the apex of the wing. The cell is traversed by three transverse black bands, the middle one of which is rather short and incomplete. Beyond these, there is a black patch on the costa in front of the apex and there is a black, thick irregular discal band and also a broad, post-discal black band from the dorsum up to vein 5. Finally there is a terminal narrow black band. The veins are conspicuouly blackened between the post-discal band and the black terminal band. On the basal half of both wings on the upperside, there are additional black spots and

irregular patches (these markings being dark brown in the female). On the upperside of the hind wing there is a series of discal black spots and a broad, post-discal black band, and a narrow black terminal band, the veins being conspicuously blackened between these two bands. The underside is paler and of a dull orange red colour with white, cream or light or dark brown bands with darkened edges. On the underside of the forewing their is a pre-apical series of dull white spots and the terminal black border is narrower than on the upperside and is traversed by a very slender broken white line. The underside is paler and of a dull orange red colour, with white, cream or light or dark brown bands with darkened edges. On the underside of the forewing there is a pre-apical series of dull white spots and the terminal black border is narrower than on the upperside and is traversed by a very slender broken white line. The underside of the hind wing is more elaborately ornamented with black markings. There are a sub-basal and a discal transverse white bands, both margined inwardly by a series of black spots and outwardly by a black line. There is also a very prominent, post-discal, transverse black band traversed by a series of paired white spots. Beyond this, there is a row of broadly U-shaped patches of the ground colour clearly demarcated by the blackened veins, and finally there is the terminal black border, traversed by white, lunulate markings. In the female, the colour is paler, and the black markings are narrower. There is considerable seasonal and individual variation in this species.

Expanse : 45 - 55 mm.

Range : Ceylon, Central and Southern India, extending northwards up to Madhya Pradesh and Kutch.

Habits : This is a common species, but rather local in its distribution. It is confined to dry open plains. Its flight is weak and almost always close to the ground, usually among branches of bushes, but at times it is able to fly rapidly and powerfully. When at rest, its wings are kept closed over the back but when it basks, it keeps its wings half open and gently sways them to and fro.

Genus **Ergolis** Boisduval

This genus includes medium-sized dark brown butterflies popularly known as Castors. The upperside of both the wings is marked by fine, wavy, black lines. The wings are broad and the forewing is obliquely truncated towards the apex.

♂ ♀ : The costa on the forewing is widely arched. The termen of the forewing, below the truncated portion, is more or less concave. The cell is narrowly closed and less than half the length of the wing. The hind wing is short, broadly ovate, rather pear-shaped. The costa and dorsum are slightly arched. The apex , termen and dorsum are curved and the terminal margin scallopped. The cell is very short and narrowly closed. The antennae are short, being about half the length of the forewing, with the club gradually enlarged and elongated. The males bear a sex mark consisting of specialised dark scales on the underside of the forewing. Only two Indian species are known and both of them are represented in the Museum collection.

Ergolis ariadne Johanssen).

The Angled Castor.

Plate XXIV, fig. 2.

Specimens in the collection : Seven, Trichur, Cochin, Shevroys and Pulneys; 44 mm. These specimens are labelled *Ergolis ariadne indica* Moore, but the name *indica* has been cited as a synonym for *ariadne* and not as a race of the latter by Bingham. The smallest specimen (40 mm.) is 5 mm. smaller than the minimum recorded expanse.

Descrition : ♂ ♀ : The upperside is dark ochreous brown. On the *forewing*, there is a small conspicuous white spot just below th costa, before the apex. The upperside of the wings is traversed by wavy dark brown lines. Two or three dark brown marks are present in the cell of both the fore and hind wings. The underside is more brownish, and both the wings bear dark chestnut-brown spots and markings and transverse sinuous bands of the same colour. A subterminal zig-zag line is present, followed by a terminal undulating dark brown line. The female is slightly paler in colour.

The forewing is deeply concave between veins 3 and 5. The termen of the hind wing is more or less deeply scallopped. This species is subject to considerable seasonal variation.

Expanse : 45 - 60 mm.

Range : Ceylon; throughout India, except in the North west regions of the Himalayas and arid regions in the Punjab. It also extends over Assam, Cachar and Burma and to the Malayan Sub-region.

Habits : This species is widely distributed and frequents the open, drier plains and lower elevations of the hills. Their flight is weak and unsteady, consisting of jerky movements of the wings. They are often found in the immediate vicinity of castor plants which are their food plants. They generally fly close to the ground and are frequently found around and among bushes and hedges in castor fields.

Ergolis merione (Cramer)

The Common Castor.

This species is easily distinguished from the preceding species by the more markedly zig-zag transverse black lines, by the presence of faintly marked spots just within the sub-terminal markings and the termen of the forewign being much less concave in the middle.

Two races, *Ergolis merione merione* (Cramer) and *Ergolis merione taprobana* Westwood, are represented in the Museum collection. The former race, which is the typical form of this species, is found in the northern half of continental Indian, and the latter is found in Southern India and Ceylon. The locality of two of the specimens of *Ergolis merione*

merione (Pulneys and Horsleykonda, Chittoor District,) seem to be incorrect, since the typical race is found only in the northern half of continental India.

Ergolis merione merione (Cramer).

The Common Castor.

Plate XXIV, fig. 3.

Specimens in the collection : Four; the localities of two of the specimens are given as Pulneys and Horsleykonda; 52 mm. This race is known only from the northern half of continental India, and hence it is doubtful if these localities are correctly recorded. If, however, these are the correct localities, then it would appear that the typical race extends into Southern India also, in which case the present two specimens will be the first record of this race from Southern India.

Description : ♂ ♀ : The upperside is yellowish brown, with the transverse black lines disposed in pairs and forming obscure bands. The black lines are all wavy and the discal line is double. The termen of the forewing is rounded. On the forewing there is a series of obscure spots within the subterminal markings, and there is also a small white, sub-costal spot in front of the apex. On the underside, the markings are much the same as on the underside in the preceding species, but the dark, chestnut bands are broader and more diffuse. In the female, the transverse lines are broader and tend to form distinct bands. In dry season forms the ground colour is paler and the transverse lines are more distinctly disposed in pairs, forming bands. There is considerable seasonal variation in this species.

Expanse : 52 - 62 mm.

Range : Northern half of continental India, Himalayas, Simla to Sikkim, Bengal, and throughout Assam. Also Rajasthan, and extending into Burma and Malayan Sub-region.

Habits : These are similar to those of the preceding species. They are common in the lower elevations in the hills: these are more abundantly found in the hills and well wooded country than the preceding species which prefer drier country and open plains.

Ergolis merione taprobana Westwood

The South Indian Common Castor.

Plate XXIV, fig. 4.

Specimens in the collection : Four, Trichur and Pulneys; 50 mm.

Description : ♂ ♀ : In this race, the ground colour is darker on both sides of the wings than in the preceding typical race, some of the markings of the underside are obscured by a suffusion of the dark chestnut and the white sub-costal spot on the upperside of the forewing is usually absent. The ground colour is dark ferruginous; the

PLATE XXIV

PLATE XXIV

Fig. 1. *Byblia ilithiya* (Drury) (natural size).

" 2. *Ergolis ariadne* (Johanssen) (natural size).

" 3. *Ergolis merione merione* (Cramer) (natural size).

" 4. *Ergolis merione taprobana* Westwood (natural size).

" 5. *Telchinia violae* (Fabricius) (natural size).

" 6. *Libythia murrha carma* Fruhstorfer (natural size).

" 7. *Abisara echerius prunosa* Moore (natural size).

" 8. *Spalgis epius epius* Westwood (x 1 ½).

PLATE XXIV

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black transverse lines are more clearly defined. The anterior half of the hind wing is smooth and unmarked, and shaded white towards the costa. On the underside also the ground colour is darker than in the preceding race, and the markings are obscured by dark chestnut shading. In the female, on the upperside of the wings, the two post-discal lines form broad cordate marks in the interspaces between the veins.

In the dry season form, the ground colour is paler.

All the specimens in the collection belong to the wet season form described above.

Expanse : 49 - 56 mm.

Range : Southern India and Ceylon.

Habits : The habits are similar to those of the typical race. The species is common in the hills of Southern India, such as Pulneys and Horsleykonda.

Family ACRAEIDAE.

This family includes only two Indian species, of which only one is South Indian. These species were included in the family Nymphalidae according to the earlier classification followed by Bingham, Antram and others. The majority of the species of Acraeidae are African.

The butterflies included in this family are yellowish or tawny brown with black spots and markings and rather scantily scaled wings. The forewings are elongated with a rather produced and narrowly rounded apex and the hind wings are rounded. The forelegs are reduced. These species mimic species of Danaids. They are avoided by birds and other animals on account of the oily, distasteful, protective fluid which exudes from their bodies. They are slow in their flight and keep close to the ground, settling frequently on the ground.

Genus **Telchinia** Hübner

The forewing is moderately elongate, with a rather convex termen. The side is yellow. The apical and terminal margins on the forewing are edged with black. Black spots and markings are present on the upperside of both the wings. The antennae bear a short and abruptly enlarged club.

A single species is known in India, and this is represented in the collection. This species is very common in South India in the plains and is frequently seen in gardens and compounds in and around Madras.

Telchinia violae (Fabricius).

The Tawny Castor.

Plate XXIV, fig. 5.

Specimens in the collection : Fifteen, Madras, Kurnool, Trivandrum and Wynaad. More specimens were collected recently from compounds around the Madras Museum; 50 mm. The smallest specimen (40 mm.) is 10 mm smaller than the minimum recorded expanse. The largest specimen in the collection is 60 mm. (from Kurnool).

Description : ♂ ♀ : The upperside is yellowish red or brick red. The forewing bears a spot in the middle of the cell, a larger spot at the apex of the cell and a discal series of spots (only the interspace 2 lacks a spot). The apex and termen are narrowly edged with black. These black edgings are produced inwards to some distance along the veins. The upperside of the hind wing also bears black spots. A few small black spots are present at the base and over the lower half of the cell. In addition to this, a subcostal spot and a post - discal series of obscure spots and a small post-discal spot are present in interspaces 3 and 6. The terminal margin bears a broad black border traversed by spots of the ground colour. the inner edge of this black border is rather irregular, being produced inwardly in the interspaces.

The underside is paler, with black markings similar to those on the upperside, but they are more numerous and larger on the hind wing where the terminal spots are also larger and white. The head and thorax are black, the latter being spotted above with white and yellow. The abdomen is black in front but yellowish and crossed by black lines behind. In the female, the spots are larger, and the terminal band of the hind wings is broader.

Expanse : 50 65 mm.

Range : Throughout Peninsular India; Northern India, from Sind to Saurashtra, Himalayas, as far as Sikkim, and Darjeeling, Bengal and Bihar; Ceylon. It is most often met with in regions having heavy rainfall.

Habits : This species is common in the plains and in the hills at low elevations almost throughout the year. They are found both in wooded regions and open country. They fly rather unsteadily close to the ground, frequently settling on the ground and visiting flowers. Although they are mostly confined to low elevations, they may be found up to an altitude of 7000 feet in the hills of Southern India. They are common in and around Madras gardens where they are especially abundant during July and August. Their food plants are generally species of the Cucumber family.

Family ERYCINIDAE.

The earlier authors included the species of Erycinidae in a subfamily (Libytheinae) under the Nymphalidae, but as some of their characters are quite distinctive and

diagnostic they are now separated into a distinct family, the Erycinidae. These forms are mainly distinguished by the structure of their forelegs; these are brush - like and rudimentary in the males, but well developed in the female. They fly rapidly, but unsteadily, seldom maintaining themselves in the air for more than a short while.

This family is divided into two subfamilies, namely, Libytheinae and Riodinae, which are widely different from each other in several respects. Of these, the former includes only a single Indian genus *Libythea*, and this is represented in the collection by a single species, *Libythea myrrha*. The latter subfamily includes mostly species from Assam, Himalayas and Burma. Only a single species of this subfamily, *Abisara echerius*, is found in South India and Ceylon, and this is the sole representative of this subfamily in the collection.

Subfamily LIBYTHEINAE.

The forewings are narrow and produced, the terminal margin being straight and truncated below the apex and then deeply concave. The upperside is dark brown, with a yellowish brown transverse band along the middle of each wing. The palpi are enormously long and produced into a beak. They settle with the wings closed together over the body, and the forewings drawn into the hind wings, so that only the hind wings and tips of the forewings which are protectively marked are visible. They mimic dry leaves when resting on twigs.

Genus **Libythea** Fabricius.

This genus includes the species popularly known as the "Beaks", on account of their enormously elongated palps which resemble a beak. The forewing is very strongly produced at vein 4, and deeply concavely indented below. The costa is widely arched. The apex of the forewing is truncate. The cell is broad and narrowly closed, less than half the length of the wing. The upperside is dark brown with tawny bands across the wings. The termen of the hind wing is undulated. The food plants are species of Urticacea.

A single species is represented in the Museum collection although two South Indian species are known.

Libythea myrrha carma Fruhstorfer.

The Club Beak.

Plate XXIV, fig . 6.

Specimens in the collection : Six, Cochin, Coorg, Pulneys, Netterikkal Region, Kalakkad Forest, Tirunelveli District; 49 mm. The race *carma* Fruhstorfer is apparently synonymous with *rama* Moore which is described as the Ceylon and South Indian form of this species by Bingham in his volume on Butterflies (Nymphalidae) in the Fauna of British India series.

Description : ♂ ♀ : This species is subject to considerable variation in its colour and markings. Typically, the upperide is dark brown, with an orange yellow streak extending from the base outwards on the forewing; this streak is continued outwards as a transversely elongate oval spot. Two orange-yellow pre-apical double spots are present, placed at an angle to the costa. The upperside of the hind wing is uniformly dark brown with a slightly oblique medial orange yellow transverse band extending from veins 1 to 6. On the underside of the forewing, the ground colour is brownish, with the markings broader and more ill-defined, and the underside of the hind wing is greyish brown, with minute black dots and transverse striae.

The antennae, head, thorax and abdomen are dark brown above and greyish brown below.

On the hind wing, the costa and termen are straight, forming an angle with each other at the apex.

Expanse : 45 - 58 mm.

Range : Ceylon, South India; Western India; Himalayas from Kulu to Sikkim, Assam, Burma, and extending into the Malayan Subregion and China.

Habits : This species frequents the hills of Southern India and the Western Ghats in South India, especially the evergreen forests, where it is commonly seen around streams and rivulets in the wooded localities. It frequently settles on damp patches on the ground and mimics a dead leaf when resting at the tip of a twig.

Subfamily RIODINAE.

In this subfamily, the forewings are generally short and broad, and the margin of the hind wing is sometimes produced into a well marked lobe which may be continued into a slender tail in some species. In forms in which there is no lobe on the hind wing, there may be a tooth-like projection, or a short, pointed tail. The upperside is dark brown, spotted or banded with yellowish brown or white. They are most abundantly represented in Central and South America.

Only a single species belonging to the genus *Abisara*, extends to Ceylon and Peninsular India, and this is the only species of this subfamily represented in the collection. The other genera and all the other species of *Abisara* are from the Himalayas, Manipur, Assam, Burma, etc., and are not represented in South India.

Genus **Abisara** Felder.

This genus includes dark brown butterflies popularly known as the Judies. They are dark brown above, with a broad discal white band on the forewing. The forewing is broadly triangular, with an obtuse apex, and slightly arched costa. The termen is convex, the tornus rounded and the dorsum straight. The cell is short, less than half the length of the forewing and narrowly closed. The hind wing is more or less triangularly ovate, and

is sometimes produced into a tail or a tooth at vein 4. Two black spots ar present below the apex on the upperside of the hind wing The cell is short and narrowly closed.

Only a single species extends into Peninsular India and Ceylon, and this is the only one of the genus represented in the collection.

Abisasa echerius prunosa Moore.

The Plum Judy.

Plate XXIV, fig.7.

Specimens in the collection : Two, one from Trivandrum, (male), and the other from Nilgiris, (female); 44 mm. Unfortunately, one wing of the latter is badly mutilated.

Description : ♂ ♀ : The upperside is purplish in the male, but only brown in the female. The upperside of the forewing bears obscure discal and post-discal transverse bands, paler than the ground colour. The upperside of the hind wing bears two small black spots near the apex of inter-space 1, and two larger sub-apical black spots. The spots bear a slender white margin on the outer side. The underside is paler brown. The underside of the forewing bears discal, post-discal and subterminal bands, and that of the hind wing bears a discal narrow transverse band and a row of subterminal black spots, margined narrowly with white, both on the outside and inside. The termen of the hind wing is produced prominently into a tooth at vein 4. In the female, the ground colour is paler, but the markings are similar. This species is subject to considerable variation in its colour and markings. In the male specimen from Trivandrum in the collection, for instance the transverse bands on the forewing are almost completely absent, but these bands are broad and distinct in the other (female) specimen from the Nilgiris. The colour of the male fades rapidly after death.

Expanse : 40 - 52 mm.

Range : Ceylon, Peninsular India. This is the range of the present race, which is the Southern form. But the species as a whole extends to North India, Himalayas, Nepal Bhutan, Assam, Bengal and Bihar, and also to Burma.

Habits : This species is commonly met with at low or moderate elevations along and around the foot of the Himalayas. In South India, they are common in the hills and in the Nilgiris they are mostly restricted to the evergreen regions up to an altitude of 5,000 feet. They frequent shady places and rest during the greater part of the day among low foliage. In the evenings they venture out, flying in a jerky, unsteady manner. When at rest, the wings are half open. They keep mostly to the undergrowth , not much above the ground.

Family LYCAENIDAE.

This family includes small to moderate-sized butterflies, popularly known as the Blues and Hairstreaks, as the blue colour predominates in their wings. But other colours are also present. The upperside is usually blue, brown or orange; some are metallic blue

or green or suffused with purple. The underside of the wings is often brilliantly coloured. The hind wings are often lobed, and in many species they often bear delicate, thread-like tails which may be short or long and somewhat broad and fluffy. The females are almost always less conspicuously coloured than the males. The precostal vein on the hind wing is absent. In some species, the differences in the colour markings on the upperside are very striking, but on the underside the markings are always the same in both sexes.

Most of these butterflies fly only in the sunshine. Many are common in open places in gardens and road sides, while others are found only in densely shaded forest. The larval history of these butterflies is very varied. The eggs are laid singly, generally on a flower or young shoot or flower stalk. The larval stages of many species are associated with ants which afford them protection in return or the sweet juice which exudes from the caterpillars on segment 11 during the last or penultimate stages of the larval phase. The ants even protect the eggs of thesebutterflies. Most larvae possess a pair of erectile organs beset with minute hairs on segment 12. These can be erected at will, and when irritated shoot out a long tentacle beset with a rosette of coloured hairs. These tentacles are whirled round rapidly and serve as a protective device, by frightening away enemies.

The food plants are varied. Most of them feed on leguminous plants.

The males of most of these species visit flowers or settle on damp patches of ground, but the females are more retiring, and keep mostly to the shaded regions of the jungle. There is much seasonal variation, and the males frequetly bear secondary sex marks.

There are several subfamilies, but the two main ones to which most of the South Indian species belong, are the Lycaeninae and the Theclinae. The former includes the so called Weak Blues which are delicate butterflies of fragile build, with rather weak flight. The latter includes the Strong Blues or Hairsreaks, distinguished by their stoutly built bodies, and strong and rapid flight.

Subfamily LYCAENINAE.

The Weak Blues.

This subfamily includes small, delicately built butterflies. The males are usually blue or bluish, but may also be brown or even metallic green or coppery brown. The females are brown or coloured different shades of blue or green like the males, but bear dark borders on the wings. The males in many species have specialised scales on the upperside of the forewing.

Genus **Spalgis** Westwood.

This genus includes only a single Indian species. The costa is slightly arched on the forewing, with a well marked angular apex and convex termen. The cell is about half the length of the forewing. The dorsum is straight. On the hind wing, the costa is somewhat straight, with the apex, termen and tornus rounded and arched. The cell is about half the length of the wing. The antennae are rather short with the club long and gradually enlarged.

Spiagis epius Westwood.

The Apefly.

Plate XXIV. fig.8.

Specimens in the collection : One, Nilgiris, 26 mm.

Description : ♂ ♀ : The upperside is violet brown, with either a diffuse or sharply defined white patch at the end of the cell in the forewing. The upperside is pale grey traversed by numerous fine, slender, dark brown undulating lines. The underside of the forewing bears an oval white spot beyond the cell. The antennae, head, thorax and abdomen are pale brown. In the female, the upperside is slightly paler brown, and the apex and termen are rounded, while in the male, they are straight. In the race *nubilus* Moore, recorded from Ceylon, Andamans and Nicobars, the ground colour is much darker.

Expanse : 20-30 mm.

Range : Southern India, Ceylon, Bengal, Assam, Sikkim, Bhutan, Kumaon and Burma.

Habits : This is a small, dull coloured butterfly, with a fairly fast, though unsteady flight. It keeps close to the ground, among bushes and branches. It settles frequently on leaves and stems of low-growing bushes with the wings closed. It is more usually found in the hills with thick vegetation at low elevations but is also met with on the plains in the wetter regions. This is a widely distributed species, but not plentifully found anywhere. The larvae are carnivorous, feeding on mealy bugs. It lives among colonies of the larger mealy bugs and feeds on them. The larva is short and thick and looks almost like the mealy bugs among which it lives and grows.

Genus **Talicada** Moore.

This genus includes the butterflies known as Pierrots, easily recognized by the broad, orange terminal area on the upperside of the hind wing.

♂ ♀ : On the forewing, the costa is widely arched. The apex is rounded, the termen convex and the dorsum slightly sinuate. The cell is long and narrow. The hind wing is ovate, with the costa, termen and dorsum forming a more or less even and continous curve. The cell is narrow, less then half the length of the wing.

Only a single Indian species is known, namely, *Talicada nyseus* Guerin, and this is represented in the collection.

Talicada nyseus nyseus Guerin.

The Red Pierrot.

Plate XXV, figs. 1 & 2.

Specimens in the collection: Four, two of them being from Malabar, and the other two from the Pulneys; 34 mm.

Description : ♂ ♀ : The upperside is brownish black, sometimes with a purplish tinge in fresh specimens. The upperside of the hind wing bears all large, prominent, orange-red patch on the terminal posterior area of the wing. Between this patch and the terminal margin there is a narrow band of the black ground colour interrupted by a regular series of white spots.

The underside is silvery white, with a quadrate spot on the discocellulars, an irregular, discal band and a terminal broad, black band bearing a median series of white spots. On the underside of the hind wing, there is a wide, basal white area marked by a few scattered black quadrate spots, and beyond this there is a wide, orange-red marginal band upto vein 6, and above this up to the costa a black band. Both the orange and black bands are traversed by white spots. Finally there is a very narrow terminal black edging to these bands, interrupted by white spots. The antennae, head, thorax and abdomen are black.

Expanse : 30 - 40 mm.

Range : Ceylon, Southern India, Assam, Khasi and Naga Hills; Upper Burma. This is the range of the species *nyseus* as a whole. But the present race *nyseus* is the typical Southern form found in South India.

Habits : This butterfly is locally abundant in certain areas. It keeps close to the ground, preferring shaded areas in thick jungle. Its flight is weak, and it settles on the ground with the wings closed, exposing the brightly marked under surface of the wings. At nights, it settles gregariously on stems and twigs of low growing bushes. It is widely distributed throughout Peninsular india, being found all over Central and Western India. In South India, it appears to be more common in the hills of Malabar and the Pulneys.

Genus **Castalius** Hübner.

This genus includes small, but prettily ornamented butterflies commonly known as the Pierrots.

♂ ♀ : The costa on the forewing is widely arched. The forewing bears a blunt apex, a convex termen and straight dorsum. The cell is elongated, being more than half the length of the wing. On the hind wing, the costa is arched, the apex broadly rounded and the termen convex. The dorsum is almost straight. The cell is less than half the length of the wing. The antennae are moderately long with the club long and gradually enlarged. All the species, except *C. rosimon*, the Common Pierrot, are inhabitants of the hills, where they are common at low elevations in places having plenty of rainfall. Their flight is weak and they frequently settle on leaves and twigs.

Of the six Indian species, only four extend to Southern and Peninsular India, and of these, three are represented in the Museum collection.

Castalius rosimon rosimon (Fabricius).

The Common Pierrot.

Plate XXV, fig. 3.

Specimens in the collection : Seven, Bangalore, Pulneys, Cochin and South Coorg ;27 mm.

Description : ♂ ♀ : The upperside is white with dark borders and black spots. The basal areas of both the wings are densely powdered with metallic blue scales which cover and obscure a large black spot on the forewing and three basal black spots on the hind wing. On the hind wing there is a post-discal, curved, transverse black band, and beyond this, a subterminal transverse series of black spots, each spot being margined on both sides by a series of slender white lunulate markings. On the inner side of the post-discal band, there are two elongate black spots, each formed of two coalesced spots. The underside is white with black spots and streaks. These include on the forewing, two parallel subterminal transverse series of black elongate spots,, and on the hind wing, post-discal and terminal markings, the latter consisting of a series of black spots. The antennae, head, thorax and abdomen are black. There is considerable seasonal variation in this species. In the female, the basal areas on the upperside of the wings are suffused with dark scales.

Expanse : 24-32 mm.

Range : The range of the species as a whole extends over Ceylon, Peninsular India, Assam, Burma, Andamans and even into the Malayan Subregion, but the present race *rosimon* is the typical southern form found in South India.

Habits : This species is common throughout Peninsular India, as well as Burma and Ceylon. In South India, they are common on the hills up to an altitude of 4000 feet. Its flight is rather weak, and it keeps close to the ground, frequently settling on leaves or twigs with the wings half closed. This species frequents both thick jungle and open country and comes out more in the open sunshine than the other members of the genus. The wet season form is as a rule more heavily ornamented with markings.

Castalius caleta (Hewitson).

The Angled Pierrot.

Plate XXV, fig. 4.

Specimens in the collection : One, Pulneys, 26 mm. It is labelled *Castalius caleta decidia*. Actually, *decidia* appears to be a synonym for *caleta* and not a race of the latter. This species is described under the name *decidia* by Bingham in his volume on Lycaenidae in the Fauna of British India Series.

Description : ♂ ♀ : The upperside is brownish black, with a broad, medial, oblique transverse white band on both the wings. In the dry season form, this white band may be very broad, and may extend over the entire surface of the hind wing except the narrow black, terminal margin. On the underside, the wings are white with black markings. On the underside of the forewing there is a short, narrow streak from the base into the cell, joined below to a broad, somewhat semicircular, angled broad band that extends from the costa to the dorsum. There is also a short, upper discal bar, with its outer edge deeply excavated. On the hind wing, there is a tooth-shaped mark at the base and other markings including three confluent spots above the tornus, and a terminal series of slender lunulate markings. The antennae, head, thorax and abdomen are black.

Expanse : 26-35 mm.

Range : Ceylon, Peninsular India, Nilgiris, Travancore, South Bihar, Madhya Pradesh, Orissa, Sikkim to Assam and Burma.

Habits : This species inhabits well wooded regions with fairly heavy rainfall. It is a shadeloving species, being frequently met with in and near shady streams and jungle clearings. It flies fairly fast. In North India it keeps to low elevations, but in the Nilgiris and Western Ghats, it has been found up to an altitude of 8000 feet. There is considerable seasonal variation in this species.

Castalius ethion (Doubleday & Hewitson).

The Banded Blue Pierrot.

Plate XXV, fig. 5.

Specimens in the collection : Six, Coorg, Pulneys and Trichur; 28 mm.

Description : ♂ : The upperside of both the fore and hind wings are traversed by a median oblique, broad, transverse white band which is broadly edged with dark blue on its inner and outer margins. The basal portions of the wings are black. The costal margin of the forewing and the terminal margins of both fore and hind wings are edged with a border of black.

♀ : The upperside is similar to that of the male, but the ground colour is dark brown and the median white, transverse band across both the wings is broader, and without any blue edging. The black at the bases of the wings and on the margins is lighter, more or less brownish black.

The underside in both the sexes is more or less similar; it is pure white, with jet black markings. On the forewing, there are two parallel streaks, extending obliquely from base to costa. An inner and outer subterminal series of black spots are present, those of the inner being quadrate and those of the outer linear. On the hind wing, there is a curved, short, basal band a spot touching it on the outside and a discal band. The subterminal

PLATE XXV

PLATE XXV

Fig. 1. *Talicada nyseus nyseus* Guerin (dorsal view, x 1 ½).

" 2. *Talicada nyseus nyseus* Guerin (ventral view, x 1 ½).

" 3. *Castalius rosimon rosimon* (Fabricius) (x 1 ½).

" 4. *Castalius caleta* (Hewitson) (x 1 ½).

" 5. *Castalius ethion* (Doubleday & Hewitson) (x 1 ½).

" 6. *Syntarucus plinius* (Fabricius) (x 1 ½).

" 7. *Azanus uranus* Butler (x 1 ½).

" 8. *Azanus jesous gamra* Lederer (x 1 ½).

" 9. *Neopithecops zalmora* (Butler) (x 1 ½).

" 10. *Everes parrhasius parrhasius* Fabricius (x 1 ½).

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and terminal markings are as on the forewing. The antennae, head, thorax and abdomen are black.

Expanse : 26 - 31 mm.

Range : Ceylon, South India, Nilgiris, Travancore, Pulneys, Assam and Burma, and extending into the Malayan Sub-region.

Habits : This species is confined to thickly wooded regions where there is heavy rainfall. It keeps to low elevations on the hills and its flight is weak. It is often found near streams and jungle clearings where it settles frequently on the moist sand on the banks of the streams. The males are seen more often than the females. It is most abundantly found at the foot of the Ghats.

Genus **Syntarucus** Moore.

This genus includes small butterflies commonly known as the Zebra Blues. This genus is described by Bingham in his volume on Lycaenidae in the Fauna of British India series under the name *Tarucus* Moore, which he treats as a synonym for *Syntarucus*. But strictly speaking *Syntarucus* is a different, though closely related, genus, and Wynter-Blyth refers to the two as distinct genera in his *Butterflies of the Indian* Region.

This genus is widely distributed, occurring in Southern Europe, Africa, Arabia, and Ceylon, Burma and China as well as India.

♂ ♀ : On the forewing, the costa is slightly arched, the apex obtusely angulated, the termen convex and the dorsum straight. The cell is about half the length of the wing. The hind wing is broad, with the costa arched, and the termen well curved and convex. The dorsum is straight for the most part but convexly arched near the base. The cell is short, less than half the length of the wing. The antennae are about half the length of the wing with spindle-shaped club.

Only one common Indian species is known, namely, *S. plinius* (Fabricius) and this is represented in the Museum collection.

Syntarucus plinius (Fabricius).

The Zebra Blue.

Plate XXV, fig. 6.

Specimens in the collection : Four, Madras and Coorg; 26 mm. Of these, one is badly damaged, with portions of the wings missing. The largest is 30 mm,. and the smallest 22 mm.

Description : The upperside is pale transparent violet-blue. On the forewing, the terminal margin is narrowly edged with brownish black, this border being broadest at the apex and narrowing behind to the tornus. On the hind wing, the costal margin is shaded

with dark brown. The underside is white, with irregular alternate broad and narrow brownish black markings, at right angles to the costa. Close to the base of the forewing, extending obliquely outwards from the dorsum is a triangular mark. A transverse series of subterminal spots are also present. On the underside of the hind wing, the bands are more or less broken up into spots. The terminal markings are as on the forewing. but the subterminal spots are larger and the two tornal spots are very conspicius and intensely black, each encircled by a ring of green scales, but these rings are faded into white in the present specimens.

♀ : The upperside is brown, with the basal area blue and the discal area white with dark spots. The brown markings have the appearance of an irregularly shaped V on a white ground. The underside is similar to that of the male but the brown bands are more regular and uninterrupted. The antennae, head, thorax and abdomen are black in both the sexes. The hind wing is tailed.

Expanse : 22 - 30 mm.

Range : India, Burma, and Ceylon, This species is widely distributed and extends to China and the Malayan sub-region also.

Habits : This species is readily distinguished by the presence of bands of markings simulating the stripes of a zebra on the underside of the wings; hence the popular name, Zebra Blues. This species is common throughout India in the drier parts of the country. Its flight is strong and swift and it is capable of sustained flight for long periods around bushes and trees. It frequently settles on leaves. In the hills of South India, it is common up to an altitude of 7000 feet. The larvae feed on various species of leguminous plants.

Genus **Azanus** Moore

This genus includes small butterflies without tails on the hind wing, commonly known as the Babul Blues. The males are violet-blue above, the females being brown. On the underside, the wings bear marginal spots and a discal series of confluent spots, and on the hind wing, in addition to these, there are two conspicuous tornal spots and small black spots in the basal and costal areas.

♂ ♀ : The forewing has the costa slightly arched. The termen is convex and the dorsum straight. The cell is about half the length of the wing. On the hind wing, the costa is arched, the termen convex and the dorsum rather sinuate. The cell is short, being less than half the length of the wing. The antennae bear abruptly enlarged clubs.

Three species are recorded in India, all of them being found in Southern India. Of these, two are represented in the collection, namely *Azanus uranus* and *Azanus jesous* each by a single specimen. The latter is readily distinguished from the former by the presence of a black spot in the middle of the cell on the underside of the forewing in both the sexes.

Azanus uranus Butler.

The Dull Babul Blue.

Plate XXV, fig.7.

Specimens in the collection : One, Cochin 22 mm.

Description : ♂ : The upperside is dull violet-blue. The costa and termen are narrowly edged with brown, these borders being reduced to thread-like brown lines. In the discal area on the forewing, a patch of specialized hair-like scales is present. The two dark spots in the tornal area on the hind wing are minute and faintly marked.

♀ : The upperside is pale silky brown with purplish blue suffusion at the base of both the wings. An anticiliary slender black line is present at the terminal margin of both the wings. The hind wing bears two small faint black spots at the tornus as in the male.

♂ ♀ : The underside is greyish white, with faintly marked white lines and markings. The underside of the hind wing bears small black spots encircled with white, in the subcostal and tornal areas, those at the tornal angle being specially large and prominent. The antennae, head, thorax and abdomen are dark brown.

Expanse : 20 - 25 mm.

Range : India; Punjab, Sikkim, Bengal, Central and Southern India.

Habits : These are small butterflies common on the open plains and in scrub regions at the foot of the hills. They occasionally ascend the hills up to an altitude of about 7000 feet. They are more abundant in dry and desert regions. They generally keep close to the ground, but their flight is fairly strong and rapid. They are capable of sustained flight for long periods. The males settle on damp patches of ground with the wings half-closed.

Azanus jesous gamra Lederer.

The African Babul Blue.

Plate XXV, fig. 8.

Specimens in the collection : One, Mysore, 20 mm.

Description : ♂ : The upperside is violet blue, with narrow black borders. The upperside of the forewing does not bear any patch of specialized scales as in the preceding species. The upperside of the hind wing bears very faintly marked, dark tornal spots.

♀ : The upperside is silky brown, tinged with blue at the bases. On the upperside of the forewing, there is a large dark brown transverse black spot at the end of the cell and a small, squarish white patch beyond. The upperside of the hind wing bears obscure dark subterminal spots towards the tornus. Both fore and hind wings bear slender, dark anticiliary lines.

♂ ♀ : The underside is pale grey. On the forewing, the costal margin bears a black spot in the cell, encircled with white and dark brown streaks and bars in the discal area. There is also a subterminal series of black spots each encircled with white. The underside of the hind wing bears a short, prominent, narrow black basal streak, a spot below it, a transverse series of four spots in the sub-basal area and a series of subterminal spots each surrounded by white. Within this series, there is a lunulated dark line and outside it, a slender, anticiliary dark line. The antennae, head, thorax and abdomen are dark brown.

Expanse : 21 - 26 mm.

Range : The species as a whole is widely distributed, occuring in Africa and Arabia besides India, Burma and Ceylon, but the present race *gamra* Lederer, is the typical South Indian race of this species.

Habits : The habits of this species are more or less the same as those of the preceding species.

Genus **Neopithecops** Distant.

This genus includes the butterflies popularly known as the Quakers. They are small to moderate-sized dark brown butterflies.

♂ ♀ : The costa is arched on the forewing. The termen is convex and the dorsum straight. The cell is longer than half the length of the forewing. The hind wing is moderately broad and triangularly ovate. The cell is longer than on the forewing.

This genus includes only a single Indian species, *Neopithecops zalmora* (Butler), and this is represented in the Museum collection.

Neopithecops Zalmora (Butler).

The Quaker.

Plate XXV, fig. 9.

Specimens in the collection : One, Travancore, 20 mm; this specimen is rather badly preserved and faded.

Description : ♂ ♀ : The upperside is dark brown, often purplish brown. In the female the ground colour is slightly paler on the disc of the forewing. There is considerable seasonal variation. In the typical wet season form (to which the present specimen belongs) there is a small white discal patch on the upperside of the forewing.

The underside is white, with a prominent small black costal spot and small black dots at the apices of some of the veins. On the underside of the hind wing there is an additional small black spot on the dorsum; there are also three small basal spots and outer discal band. On the underside of the forewing, there is a post-discal irregular series of slender

brown lunulate markings. The antennae, head, thorax and abdomen are dark brown. There is no tail on the hind wing.

In the dry season form, the ground colour is paler, and on the forewing there is a large oval while discal spot.

Expanse : 20 - 30 mm.

Range : Southern India, Ceylon; Northern India, Bengal, Orissa, Assam, Eastern Himalayas, Burma, and extending to Andamans and Malay Peninsula.

Habits : This species occurs in hills of Southern India at low elevations in areas of evergreen forest having heavy rainfall. It keeps close to the ground and its flight is weak and rather unsteady. It frequently settles on leaves, stems and flowers and on damp patches of sand. This species is mostly confined to well wooded areas.

Genus **Everes** Hübner

This genus includes small, attractively ornamented butterflies popularly known as the Cupids. The males are usually deep blue on the upperside and the females are brown. The hind wings generally have orange markings at the tornus, at least on the undersides. The hind wings are usually tailed.

♂ ♀ : The costa on the forewing is widely arched. The apex is blunt, the dorsum straight, the tornus obtuse and the termen strongly convex. The cell is about half the length of the wing. On the hind wing, the costa is slightly arched, the apex more or less rounded and the termen strongly curved. The dorsum is slightly convex. The cell is less than half the length of the wing. The antennae have a comparatively large and gradually enlarged club.

Except one species, these butterflies are all confined to the hills. They frequent open places and are fond of sunshine. The males are found plentifully in damp sandy areas.

Out of the five or six Indian species of this genus, only one has been recorded from South India and this is represented in the Museum collection. The other species are known only from Assam, Bhutan, Baluchistan, Himalayas and Burma.

Everes parrhasius parrhasius (Fabricius).

The Indian Cupid.

Plate XXV, fig. 10.

This species is quoted by Bingham, in his volume on the Lycaenidae in the Fauna of British India series, under the name *Hesperia parrhasius* as a synonym for *Everes argiades*, but the latter is a distinct species, found only in the Himalayan regions from Chitral to Kumaon and in Sikkim and Bhutan.

Specimens in the collection : Two, one from the Nilgiris, and the other from Madras; 22 mm.

Description : ♂ : The upperside is dark blue with a broad, brown border. The costa on the forewing bears a narrow brownish line. On the hind wing, the costal margin is broadly edged with brown. There are subterminal black spots on the posterior half of the wing.

♀ : The upperside is brown or black with or without pale blue discal areas. The costa, apex and termen on the forewing are broadly brownish black with a slender submarginal black line as in the male. The hind wing is more or less as in the male, but the costal brown border is much broader.

♂ ♀ : The underside of the hind wing bears spots, some of which are black and others grey, but not much darker than the ground colour. The hind wing is tailed.

There is considerable variation in this species. The present race *parrhasius* is the typical South Indian race. In the race found in Assam and Burma, the males are darker blue, and the females uniformly black on the upperside.

Expanse : 22 - 28 mm.

Range : The range of the species as a whole extends over Ceylon, Peninsular India, Simla, Assam, and Burma, but the present race, *parrhasius* is the South Indian form.

Habits : This species is found both on the plains and in the hills, but is almost always confined to wooded or hilly country. It is a widely distributed species, usually keeping to low elevations, but in Ceylon it has been taken on the hills up to an altitude of 6000 feet. This is the only species of this genus that is found in the plains as well.

Genus **Lycaenopsis** Felder.

This genus includes small to moderate-sized butterflies popularly known as the Hedge Blues. Species of this genus have been described under the synonymous generic name *Cyaniris* Dalman, by Bingham in his volume on the Lycaenidae in the Fauna of British India series.

♂ ♀ : The forewing is broad and short, with the costa only very slightly arched The dorsum is slightly sinuate and the terminal margin convex. The cell is about half the length of the wing. the hind wing is broadly ovate with the costa slightly arched. The apex and termen are also strongly arched. the tornus is somewhat angular. The antennae are fairly short, with the club long and flattened.

In the males, the upperside is bright blue with dark borders on the forewings. In the females, the borders are broader and the hind wing usually bears marginal lunulate markings. On the underside of the wings, there are a discal row of spots and marginal lunulate markings. Some species, especially those from the Eastern Himalayas, show considerable seasonal variation.

Most of the species are confined to the Himalayas and hills of North East India. They are found at moderate elevations. They are fond of sunshine and fly in open clearings and

around streams and rivulets. The males settle on damp patches of ground frequently. This genus includes some of the commonest and most prettily marked species of Indian butterflies.

Out of the total of about sixteen Indian species, only about five are found in South India or Peninsular India and Ceylon. Of these five, only three are represented in the Museum collection.

Lycaenopsis puspa gisca (Fruhstorfer).

The Common Hedge Blue.

Plate XXVI. fig. 1.

Specimens in the collection : Six, Pulneys and Nilgiris; 30 mm. Unfortunately, some of these are faded and in one of them the wings on one side have been completely lost.

Description : ♂ : The upperside is iridescent violet-blue. On the forewing, the costa, apex and termen are bordered with black. on the hind wing, the costa is vey broadly, and the termen more narrowly, bordered with black. The black border of the termen is made up of a series of rounded coalescent black spots which are bordered on the inside by faint lunulate markings.

♀ : The upperside is white, with the bases of the wings, and in some specimens the posterior part of the hind wing, suffused with iridescent blue. The costa and apex are broadly black, and both wings bear broad white patches on the disc. On the hind wing, the termen below vein 6 bears a series of subterminal black spots.

♂ ♀ : On the underside, the markings are coarse and dusky on a slightly bluish white ground. On the forewing the spot in interspace 2 is oblique and directed towards the spot at the end of the cell, and the spot in interspace 3 is vertical and directed towards the centre of spot in interspace 4. Beyond this, there are terminal markings consisting of an inner subterminal lunular line and outer subterminal series of transverse spots. On the hind wing, two basal and three sub-basal spots are present one below the other. There are also a spot at the base of interspace 6, a much larger spot above it in interspace 7 and a discal series of five spots followed by subterminal markings as on the forewing.

The antennae, head, thorax and abdomen are dusky black, the antennae being marked with white rings.

The above description applies to the typical wet season form.

In the dry season form, the white patches on the wings are broader in both sexes, and in the female the blue iridescence at the base of the wings on the upperside is considerably restricted or even entirely absent.

Expanse : 28 - 35 mm.

Range : The range of the species as a whole extends over Peninsular India, Himalayas, Assam, Burma, Andamans, and even into the malayan Sub-region. But present race, *gisca* (Fruhstorfer) is the typical South Indian form.

Habits : This is the most widely distributed and perhaps one of the commonest species of this genus. It frequents low elevations and occurs widely over the Himalayan foot-hills and in the wooded regions of Peninsular India. It is often met with in jungle clearings and on hill tops. The males are found in large numbers settling on wet patches of sand. There is considerable seasonal variation in this species.

Lycaenopsis albidisca Moore.

The White-Disc Hedge Blue.

Plate XXVI, fig. 2.

Specimens in the collection : Five, Pulneys and the Netterikkal Region of the Kalakkad Forest, Tirunelveli, Tirunelveli District; 36 mm.

Description : This species is strictly confined to the Hills of South India. It is closely allied to the preceding species which it resembles in many respects.

♂ : The upperside is glossy indigo-blue. The white on both the fore and hind wings is more sharply defined than in the preceding species. On the forewing there are two well defined coalescent white patches at the bases of interspaces 2 and 3. On the hind wing there is a similar patch in the basal portion of interspace 6.

♀ : The ground colour and the white patch on the disc are almost as in the female of the preceding species, but the white area is more restricted both on the fore and hind wings and consequently the black borders are broader. The bases of both the wings and the tornal area of the hind wing are tinged with blue.

♂ ♀ : The underside is pale grey, the markings being smaller and more delicate than in the preceding species. On the forewing, the post-discal series is composed of linear markings arranged bisinuately. On the hind wing, the spot in interspace 7 is linear instead of being rounded. The spots on the discal area of the hind wing posteriorly are more regular than in the preceding species.

The antennae, head, thorax and abdomen are dusky black as in *L. puspa.*

Expanse : 32 - 38 mm.

Range : Hills of Southern India at moderately high elevations.

Habits : This is a fairly common species restricted in its distribution to the hills of Southern India, and is found usually above an altitude of 5000 feet, mostly during the North East monsoon and during summer. Its flight is fairly strong and rapid. It has been recorded from the hills of Mysore and Travancore, the Pulneys, Anamalais, Nilgiris and Shevroys. This species closely resembles the preceding species, the Common Hedge

Blue, and is sometimes mistaken for it, but may be readily distinguished from it by the white patches on the upperside in the male being more sharply defined and the bluish gloss on the upperside in the female being less brilliant, with the white patches relatively larger.

Lycaenopsis limbata limbata (Moore)

Plate XXVI, fig. 3.

Specimens in the collection : One, Coorg; 28 mm. The specimen is faded into a uniform dull brown.

Description : ♂ : The upperside is uniformly dark purplish blue. The terminal margin bears a narrow black border both on the fore and hind wings. The underside is white, tinged with light greyish blue. The markings are pale brown and arranged as in *L. puspa*, though smaller and narrower.

♀ : The upperside of both the wings is bluish purple, beautifully iridescent. The costa and termen are broadly bordered with brownish black while the termen is more narrowly bordered with the same colour. On the hind wing, the terminal dark border bears a series of blue lunulate markings. On the underside the colour and markings are as in the male.

The antennae, head, thorax and abdomen are dark brownish black, the antennae being tinged with white.

Strangely enough, Wynter-Blyth, in his *Butterflies of the Indian Region* has omitted this species, but instead, he has described *L. lavendularis* as one of the common South Indian species. Bingham, in his volume on the Lycaenidae in the Fauna of British India series, cites *lavendularis* as a synonym of *L.puspa* and at the same time describes *lavendularis* as a variety under the species *puspa*. Taking into consideration the close resemblance between the species *lavendularis* as described by Wynter-Blyth and *limbata* of Bingham, it appears quite possible that *limbata* should prove to be no more than a synonym of *lavendularis* as treated by Wynter-Blyth; and the size of the present specimen (28 mm.) also suggests that this is quite probable as the range of expanse cited for *lavendularis* by Wynter-Blyth is 28 - 34 mm, as against 32 - 36 mm. cited for *limbata* by Bingham. However, further specimens have to be examined before they can be definitely assigned to *lavendularis*.

Expanse : 32 - 36 mm.

Range : South India. Nilgiris, Anamalais and Pulney Hills; also hills of Bengal, Assam and Ceylon.

Habits : This species is fairly common in the hills of Southern India. It frequents jungle clearings as well as more open country. It is found at moderate elevations, and its flight is rather weak. This species resembles very closely *L. lavendularis*, the Plain Hedge

Blue, especially in the absence of white patches on the upperside of the wings, and as already mentioned, the two may be synonymous.

Genus **Chilades** Moore

This genus includes dull purplish blue butterflies, commonly called the Lime Blues. This is a very widely distributed genus, occurring even in North Africa, S.E. Europe, China, Australia and Malay Peninsula, but in India only one species has been recorded, and this species is represented in the Museum collections. This genus is very closely allied to *Lycaena* from which it differs in the character of the wing markings on the underside.

Chilades laius (Cramer).

The Lime Blue.

Plate XXVI, fig. 4.

Specimens in the collection : Eight, Cochin, Bangalore, Nilgiris, Madras; 28 mm. Unfortunately, the wings are in a bad state of preservation in some of the specimens.

Description : ♂ : The upperside is dull purplish blue. On the forewing, the base and lower half of the costa are suffused with pale blue. A thread-like, slender dark brown line borders the terminal and costal margins. On the hind wing the costa is bordered with a broad, dusky black margin. Two subterminal black spots with white border are present in interspace 1 and a similar smaller spot in interspace 2.

♀ : The upperside is dark brown. The fore and hind wings are short with metallic iridescent blue over the bases. The upperside of the hind wing bears a curved post-discal series of whitish lunulate spots which may be absent in some specimens. This is followed by a subterminal series of black spots that are bordered with white rings.

♂ ♀ : The underside is pale grey. The underside of the forewing bears a transverse broad lunulate discal spot and beyond this, a tansverse post-discal series of six dark brown spots - all of them edged with white. There is on the underside of the forewing an additional costal spot in the angle formed between veins 7 and 9. There is also a subterminal series of tansverse elongate spots with an inner series of brown lunulate spots. Beyond this there is the usual marginal slender black line. The underside of the hind wing bears jet black spots narrowly encircled with white. The discal spot in interspace 6 is out of line. A subcostal spot is larger and more prominent than the others in the middle of interspace 7.

The antennae are black, and the head, thorax and abdomen are brown.

The above description applies to the typical wet season form to which the specimens in the collection belongs.

PLATE XXVI

PLATE XXVI

Fig. 1. Lycaenopsis puspa gisca (Fruhstorfer) (x 1 ½).

" 2. Lycaenopsis albidisca Moore (x 1 ½).

" 3. Lpcaenopsis limbata limbata Moore (x 1 ½).

" 4. Chilades laius (Cramer) (x 1 ½).

" 5. Zizeeria trochilus putli Kollar (x 1 ½).

" 6. Zizeeria lysimon Hübner (x 1 ½).

" 7. *Zizeeria gaika* Trimen (x 1 ½).

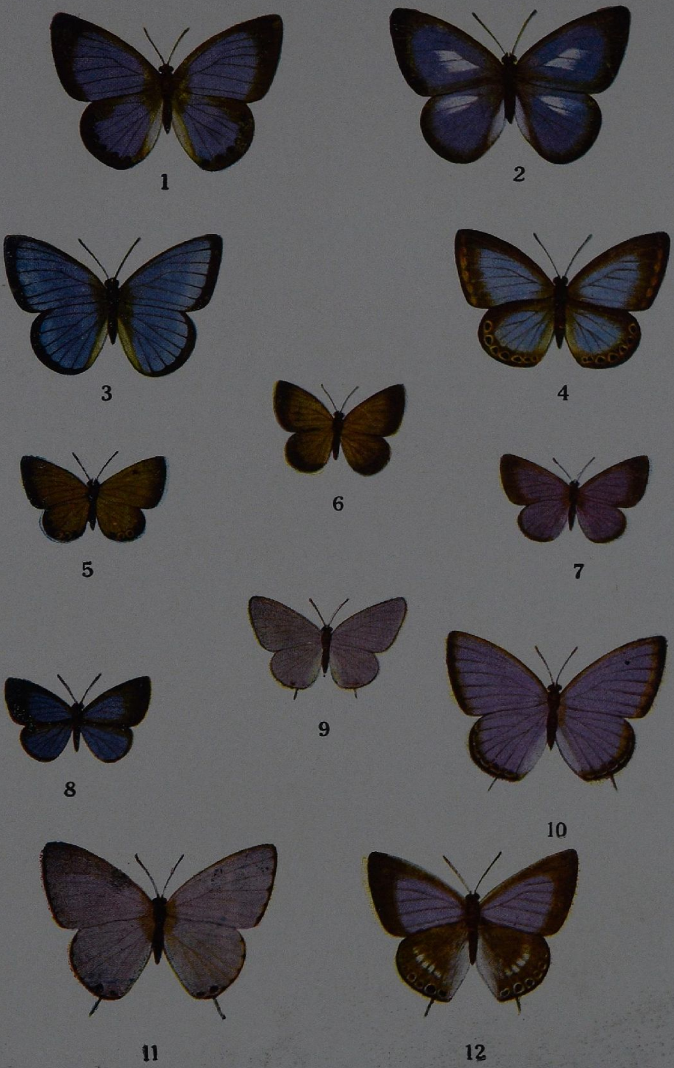
" 8. *Zizeeria otis decreta* Butler (x 1 ½).

" 9. *Euchrysops cnejus* Fabricius (x 1 ½).

" 10. *Euchrysops pandava pandava* (Horsfield) (x 1 ½).

" 11. *Catochrysops strabo* (Fabricius) (x 1 ½).

" 12. *Lampides boeticus* (Linnaeus) (x 1 ½).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In the dry season form, the ground colour of the upperside is somewhat paler, and in the female, the upperside is rather pale blue with broad brown borders. In both sexes, on the underside of the hind wing there is a large cloudy brown patch posteriorly.

Expanse : 26 - 30 mm.

Range : Ceylon, India, Burma; Himalayas, ranging from the North West Provinces eastwards to Assam and Bengal; Central and Southern India.

Habits : This species is common throughout the plains of Southern India and in the hills it is found up to an altitude of 4000 feet. It flies close to the ground and comes out often in the open sunshine. Its larval food plants are the Lime and the Pomelo and it is found wherever these plants are abundant.

Genus **Zizeeria** Moore.

This genus includes very small, prettily coloured butterflies commonly as the Grass Blues. The upperside is generally blue with dark borders, or brown, with or without bluish scales at the base. This generic name is spelt as *Zizera* in Bingham's volume in the Fauna of British India series and other earlier works.

♂ ♀ : On the forewing the costa is widely arched and the apex blunt,but well defined. The termen is short and convex. The cell is short, being a little less than half the length of the wing. The hind wing is ovate, with veins 3 and 4 commencing from the lower apex of the cell. The antennae has the club elongated and more or less spatulate.

Of the five recorded Indian species of this genus, four are represented in the Museum collection, but most of the specimens in the collections are in an imperfect condition.

Zizeeria trochilus putli Kollar.

The Southern Grass Jewel.

Plate XXVI, fig. 5.

Specimens in the collection : One, Madras; 16 mm. The South Indian form is separated as race *putli*. Recently, however, this has even been separated as a distinct species by some authors. This species is referred to as *Chilades trochilus* in Bingham's volume on the Lycaenidae in the Fauna of British India series, although the correct position of this species is under the genus *Zizeeria*.

Description : ♂ : The upperside is brown, the shade of brown varying in different specimens. The upperside of the forewing is uniform with an ill-defined dark marginal line in some specimens. On the hind wing a subterminal series of round black spots bordered on the inside with yellowish brown edgings are present. The underside is pale silky brown with a short line in the discal area, a curved discal series of small rings and a post-discal series of lunulate markings on the forewing. The underside of the hind wing bears two short white lines within the discal area and the other markings are as on the

underside of the forewing, but there is a complete series of dark spots between the subterminal series of white lunulate markings and the white terminal line.

♀ : The upper and undersides are as in the male, but the markings are larger and more clearly defined. On the hind wing the yellow patches bordering the subterminal black spots are wider and more prominent.

The antennae, head, thorax and abdomen are brown in both the sexes.

The jewelled, metallic, orange-crowned spots on the hind wing have given rise to the popular name of this species, namely, the Grass Jewel.

In the South Indian race *putli* Kollar, to which the single specimen in the collection belongs, and which has now been separated as a distinct species, the hind wing has the marginal spots prominently covered with orange both on the upper and undersides, and the underside is paler.

Expanse : 15 - 25 mm.

Range : The range of the species as a whole is wide and extends throughout India at low elevations and also to Burma, South Eastern Europe, Africa, Arabia and Central Asia; also Australia and the Malayan Sub-region. But the present race, *putli* Kollar, is confined to Ceylon, South Indian and North East india.

Habits : This species is common in the hills of South India at low elevations. These butterflies fly close to the ground in open, grassy meadows. Their flight is weak and interrupted. They settle frequently on low vegetation, and often come out in the open sunshine. This is one of the smallest of all Indian butterflies.

Zizeeria lysimon Hübner.

The Dark Grass Blue.

Plate XXVI, fig. 6.

Specimens in the collection : One, Bangalore, 18 mm. The wings on the left side are badly damaged in this specimen.

Description : ♂ : The upperside is deep blue, suffused with violet, and with broad, dark brown margins. On the upperside of the hind wing, a subterminal series of black, round spots are present in some specimens. The underside is grey, with a spot in the middle of the cell and a curved discal series of eight black spots on the forewing. Beyond these, there is an inner and outer subterminal series of elongate dusky spots. On the underside of the hind wing there is a transverse, curved, sub-basal series of four spots but the other markings (discal, terminal and subterminal) are more or less the same as on the foreiwng.

♀ : The upperside is brown, with blue scaling in some specimens. The forewing bears a short, transverse, dusky line on the discocellulars. On the underside, the ground

colour is darker, but in some specimens it is pale brown, and the markings on both the fore and hind wings are as in the male.

The antennaae are black, ringed with white, and the head, thorax and abdomen are brownish.

Expanse : 18 - 24 mm.

Range : This is a widely distributed species, its range extending over Southern Europe, Africa and Asia. In the Indian Region it is found throughout India, Burma and Ceylon. Its distribution also extends to the Malayan Subregion and Australia, and even to Madagascar.

Habits : This is a common species, and is one of the smallest of the Indian species of butterflies. There is some seasonal variation in this species. In the wet season forms, the male has broader terminal brown markings and the female has more extensive violet suffusion of the wings on the upperside. The habits are more or less similar to those of the preceding species.

Zizeeria gaika (Trimen).

The Tiny Grass Blue.

Plate XXVI. fig. 7.

Specimens in the collection : One, Nilgiris; 16 mm. The specimen is incomplete, with the left forewing missing.

Description : ♂ : The upperside is dull blue, with a broad, dark border. This border is margined on the outside by a thin darker brown marginal line. On the hind wing, the ground colour is brighter and the brown borders are narrower. The underside is grey. The underside of the forewing bears sharply defined markings consisting of two subcostal black spots above the cell and a strongly curved series of five discal black spots. The underside of the hind wing bears a sub-bascal series of three spots followed by a curved discal series of eight spots.

♀ : The upperside is plain glossy brown, without any violet tinge. The underside is similar to that of the male, but the ground colour is slightly darker and the markings are more prominent.

The antennae are black, and the head, thorax and abdomen are dark brown, the head and thorax bearing a violet tinge on the upperside in the male.

Expanse : 16 - 24 mm.

Range : Throughout Peninsular India, Burma and Ceylon. Also extending to South Africa and to the Malayan Subregion.

Habits : As the popular name suggests, this is one of the tiniest of Indian butterflies, being hardly more than about half an inch across the wings. This is a common species of Grass Blues, and its habits are similar to those of the preceding species of *Zizeeria*. It occurs in grass and low herbage throughout India, but is best known in hilly localities.

Zizeeria otis decreta (Butler).

The Lesser Grass Blue.

Plate XXVI, fig. 8.

Specimens in the collection : Four, Madras; 20 mm. Unfortunately the wings are damaged or partly missing in all of them.

Description : This species differs from the preceding one in having no subcostal spots on the underside of the forewing.

♂ : The upperside is bluish violet with a silvery iridescence. The forwing bears a broad, brown margin along the termen and towards the apex. The hind wing also bears a broad, brown border on the apical,costal and terminal margins. Beyond the brown margins, there is a slender black marginal line both on the fore and hind wings. The underside is brownish grey. The underside of the forewing bears a curved discal series of seven minute black spots. Beyond this there is a series of inner and outer subterminal dusky spots. The underside of the hind wing bears a sub-basal series of four spots and a discal series of nine spots of which the spot in interspace 6 is shifted inwards and not in line with the spots in interspaces 5 and 7. Each of these spots is encircled with a narrow rim of white. The terminal markings are more or less as on the underside of the forewing. There are no spots in the cell on the underside of the hind wing.

♀ : The upperside is brown, suffused with violet-blue at the bases of the wings. Both the fore and hind wings have slender, marginal dark lines. On the underside, the markings are similar to those in the male, but the ground colour is darker.

The antennae are black, with shafts ringed with white, and the head, throax and abdomen are brown, with blue scaling.

Expanse : 19 - 26 mm.

Range : The range of the species as a whole extends over India, Burma and Ceylon. Within India it has been recorded from Punjab, Sikkim, Bengal, Assam, Central, Western and Southern India. The present race, *decreta* Butler, is the South Indian form, but the differences are very slight, and it can be hardly distinguished from the typical form.

Habits : This is common species found in open, grassy fields and meadows flying unsteadily close to the ground. It is widespread in India. Its habits are in general similar to those of the preceding species of Grass Blues. The larvae feed on the leaves of the sensitive plant, *Mimosa pudica*. It is essentially a butterfly of the plains. Occasionally it has been taken on the hills.

Genus **Euchrysops** Butler

This genus includes the species commonly known as the Plains Cupids and allied forms. This is referred to by the name *Catochrysops* Boisduval, by Bingham in his volume on Butterflies in the Fauna of British India series. But *Catochrysops* is a distinct genus and is not synonymous with *Euchrysops*.

♂ ♀ : The costa on the forewing is arched. The termen is convex and the apex somewhat acute. The dorsum is straight and the cell is about half the length of the wing. The hind wing is elongated and pear-shaped, with the apex rounded, the costa only slightly arched and the dorsum slightly convex. The cell is short, less than half the length of the wing. The antennae are slender with the club gradually enlarged. The hind wing is tailed. The males are blue above with a narrow dark outer border and the females brown above with the basal and discal areas overlaid with blue scales. On the underside, both wings bear marginal and discal rows of confluent spots and the hind wing bears spots at the base, in both the sexes.

Of the three Indian species of this genus, two are represented in the Museum collection.

Euchrysops cnejus (Fabricius).

The Gram Blue.

Plate XXVI, fig. 9.

Specimens in the collection : One, Madras; 21 mm. The specimen, which is a male, is rather faded.

Description : ♂ : The upperside is pale purplish, with a bluish tinge. The upperside of the forewing bears a slender, black marginal line edged on the innerside with dark brown. The upperside of the hind wing bears two tornal spots, namely a subterminal black spot in interspace 1 and another similar spot in interspace 2. As on the forewing, there is a slender black marginal line edged on the inner side with dark brown. The underside is silvery grey and the fore and hind wings each bear on the underside a series of discal brown spots narrowly edged with white on either side, including a transverse, elongate discal band. On the hind wing the discal band is broken into separate spots near the tornus. There are also an inner and outer subterminal transverse series of spots of which the inner subterminal series on the hind wing consists of lunulate spots. The antennae, head, thorax and abdomen are dark brown.

♀ : The upperside is dark brown. On the forewing, a triangular area at the base is bluish. The hind wing is also suffused with blue posteriorly on the upperside. On the underside the ground colour and markings are as in the male.

Expanse : 25 - 33 mm.

Range : India, Burma and Ceylon. This species is widely distributed, its range extending also into Australia.

Habits : This species is common throughout India and is found in the hills upto about 8000 feet. Its flight is strong and rapid, and it often rises high in the air. It frequently settles on flowers and also on damp patches of sand where it basks with the wings half open. There is considerable variation in size in this species. The food plants are leguminous. This butterfly is a pest of green crops in South India.

Euchrysops pandava pandava (Horsfield).

The Plains Cupid.

Plate XXVI, fig. 10.

Specimens in the collection : Six, one of which is labelled "Madras". The exact locality of the other specimens is not recorded; 28.5 mm. The smallest specimen (19 mm.) is 6 mm. smaller than the minimum recorded expanse. Unfortunately, the wings are damaged in some of the specimens.

Description : ♂ : The upperside is bright lavender blue, with the veins darkened. On the forewing, the costal margin is narrowly edged with dark brown and the terminal margin more broadly edged with dark brown. The termen also bears a slender marginal black line. The upperside of the hind wing bears a subterminal series of black spots outwardly edged by a white line. As on the forewing, there is a slender, marginal black line. The underside is greyish brown, darker than the upperside, and bears transverse dark brown markings on each wing. These markings are edged with white lines on the inner and outer sides. They include a discal band, two posterior elongate spots and inner and outer subterminal bands. On the underside of the hind wing the tornal black spots may be absent, but if present, the spot in interspace 2 is much larger.

♀ : The upperside is brown. On the forewing, the basal area is suffused with blue which extends outwards over about half the length of the wing down its middle. On the upperside of the hind wing, there is a blue iridescence near the base. The subterminal spots are lager than on the forewing. The underside is as in the male, but the markings are slightly larger and more clearly defined. The antennae are black, and the head, thorax and abdomen are brown the head and thorax being covered with bluish hairs.

The above description applies to the wet season form which is the typicl form of the species.

In the dry season form, which occurs only in the South West monsoon areas, the bluish area in the female extends outwards on the forewing to three fourths of its length from the base and on the hind wing, the bluish area covers the entire median part of the wing from the base to the subterminal row of spots. On the underside, the ground colour is darker, and on the underside of the hind wing, the discal band is wide and is coalescent with the spot at the end of the cell to form a very broad, ill-defined medial band on the wing.

Expanse : 25 - 38 mm.

Range : The range of the species as a whole extends over India, Burma and Ceylon. In India, this species is confined to Peninsular India, south of the Himalayas, excluding the dry desert regions of Northern India. Its range extends to the Malayalan subregions. The typicl South Indian race is *Euchrysops pandava pandava* to which the specimens in the Museum collection belong. Another race, *minuta*, is found in the arid regions of North and North West India.

Habits : This species is found mostly at low elevations and confined to the wetter and more thickly wooded regions of India. Its flight is less rapid and powerful than that of the preceding species. Males frequently settle on damp patches of sand. These butterflies usually fly close to the ground in grassland and weed-infested areas.

Genus **Catochrysops** Boisduval.

This genus includes medium-sized butterflies popularly known as the Forget-me-nots. For merly, this genus included four Indian species, of which two, namely, *pandava* and *cnejus* have now been separated into a distinct genus, *Euchrysops*.

♂ ♀ : On the forewing, the costa is arched, and the apex is acute. The termen is convex and the dorsum straight. The cell is about half the length of the wing. The hind wing is somewhat elongate and pear-shaped. The termen and dorsum are slightly convex. The cell is short, being less than half the length of the wing. The antennae are fairly short, slender and with gradually enlarged club. The body is robust.

Of the two Indian species at present included in this genus, one is very rare and occurs only in Assam, Burma and Ceylon. The other species, *Catochrysops strabo* (Fabricius), is the only common Indian species of this genus and this is represented in the collection.

Catochrysops strabo (Fabricius).

The Forget-me-Not.

Plate XXVI, fig. 11.

Specimens in the collection : Five, one of which is from the Nilgiris and another from the Pulneys, 28.5 mm. The locality of the remaining three specimens is not recorded. The wings in some of the specimens are badly mutilated.

Description : This species closely resembles the Gram Blue, *Euchrysops cnejus* (Fabricius), in colour and apearance.

♂ : The upperside is pale violet-blue (faded into a dull brown in the present specimens). The margins of the wings bear a slender black line. On the upperside of the hind wing there is, in interspace 1, a short transverse subterminal brown bar with whitish border on the inner side. Interspace 2 bears a prominent, round, black tornal

spot, edged on the inside by a faint blue lunulate marking. The underside is dull pale grey. On the underside of the forewing, the discal band is broken into two parts and a small round spot is present on the costa between the end of the band and the spot at the end of the cell. This sub-costal spot is encircled with white. In addition to these, there is a faint, subterminal band and a terminal series of spots edged with white on the inner side. The underside of the hind wing bears a sub-basal spot, a large subterminal round spot in interspace 2 and a spot in interspace 7, beyond the sub-basal spot. There are also other small specks and bands and lunulate markings.

♀ : The upperside is brown, with the base and discal areas suffused with metallic blue. On both the wings, the costal and terminal areas are broadly bordered with brownish black. The upperside of the hind wing bears a discal series of fuscous brown spots. One large, prominent, black spot is present in the tornal area of the hind wing and in front of this spot are present a linear black spot encircled with white in each interspace. On the underside the ground colour and markings are as in the male.

The antennae, head, thorax and abdomen are dark brown.

Expanse : 25 - 38 mm.

Range : India, Burma and Ceylon. In India, it occurs throughout Peninsular India, south of the Himalayas, and in Assam.

Habits : This species closey resembles *Euchrysops cnejus* in appearance and habits. It is a common butterfly found all over india especially in weed-infested open fields. Its flight is rapid, and it ascends the hills up to an altitude of 10,000 feet. Its larvae feed on various species of leguminous plants.

Genus **Lampides** Hübner.

This genus includes medium-sized butterflies commonly known as the Pea Blues.

There has been some confusion regarding the exact nomenclature of this genus. The species formerly assigned to this genus by Bingham in his volume on Lycaenidae in the Fauna of British India series, have now been separated into the genus *Jamides* HÜbner, which Bingham cites as a synonym for *Lampides* HÜbner. But the only species which is now retained under the genus *Lampides* is *Lampides boeticus* and this has been treated as a species of *Polyommatus* by Bingham. *Polyommatus*, however, is a distinct genus, and species that are correctly referable to the genus *Polyommatus* are treated as species of *Lycaena* according to the older system of classification followed by Bingham. I have followed the latest system adopted by Wynter-Blyth in placing the species *boeticus* under the genus *Lampides*.

♂ ♀ : On the forewing the costa is nearly straight. The apex is well defined, the termen convex and the dorsum straight. the cell is slightly less than half the length of the wing. On the hind wing, the costa is slightly arched the apex rounded, and the termen straight in the female, and slightly convex in the male. The dorsum is straight and long.

The cell is short, being less than half the length of the wing. The antennae ae short with long, gradually enlarged club. The male bears a patch of specialized scales.

This genus includes only a single Indian species, *Lampides boeticus*, and this is represented in the collection.

Lampides boeticus (Linnaeus).

The Pea Blue,

Plate XXVI, fig. 12.

Specimens in the collection : Six, Bangalore, Pulney Hills. South India; 29 mm.

Description : ♂ : The upperside is violet-blue, overlaid with white scale-like hairs which give the wings a frosted appearance. On the forewing, the costa is narrowly bordered with brown and the termen more broadly so. On the hind wing, the termen is narrowly bordered with brown, while the costa and apex bear a broad brown border. The upperside of the hind wing bears two prominent black tornal spots each encircled by a ring of bluish white. The hind wing bears a tail, tipped with white. The underside is pale brown or greyish brown, or whitish with narrow brown bands. On the underside of the hind wing, in addition to the brown bands, there are two black, orange crowned tornal spots. These spots are suffused with metallic bluish-green scales in fresh specimens.

♀ : The upperside is dark brown with the basal area iridescent blue. The upperside of the forewing bears faintly marked subterminal series of bluish spots. The upperside of the hind wing bears a post-discal pale transverse band and a subterminal series of spots encircled with white. The two posterior spots are black, while the others are brown. The underside is as in the male.

In both the sexes, the antennae, head, thorax and abdomen are brown,and the hind wings are tailed.

Expanse : 24 - 38 mm.

Range : Throughout India, Burma and Ceylon. This is a widely distributed species, its range extending over the whole of Europe, Asia and Africa, and even to the Malayan subregion and Australia.

Habits : This is a migratory species. Large numbers of this species migrate from South East to North West India during March and April. Its flight is strong. It is common all over India, and may be seen frequently settling on flowers and on the ground, especially on damp patches of ground. There is considerable variation in size, but the markings are more or less constant. The larvae feed on the pods and flowers of leguminous plants.

Genus **Jamides** Hübner.

This genus includes fair-sized, bluish white butterflies, commonly known as the Ceruleans.

This genus has been considered synonymous with *Lampides* by Bingham in his volume on Lycaenidae in the Fauna of British India series, But as pointed out earlier, *Lampides* is a distinct genus including a single species, *boeticus*, which Bingham includes under the genus *Polyommatus*. However, species correctly referable to *Jamides* are described as species of *Lampides* by Bingham, according to the older scheme of classification.

♂ : The upperside is uniformely coloured, varying from bluish white to a deep glossy azure blue, with a more or less black outer margin, reduced to a narrow, thread-like line on the hind wing (except in *J. bochus* in which there is a broad, black, outer border and black special area on the forewing).

♀ : The upperside is pale blue, with a broad, black border on the forewing and marginal black spots on the hind wing.

♂ ♀ : On the underside, both sexes bear marginal white lines on both the wings. In addition to these, the forewing bears four, and the hind wing six, discal white lines. The hind wings are tailed.

About eight species are recorded from India. Of these only three species are found in South India. And all these three are represented in the Museum collection.

Jamides bochus bochus Cramer.

The Dark Cerulean.

Plate XXVII, fig. 1.

Specimens in the collection : One, Bangalore; 25 mm.

Description : ♂ : The upperside is bright, dark, metallic blue, with a very broad, black outer border, and a black apical area on the forewing. On the upperside of the hind wing, the costal margin and the dorsal margin bear a narrow brownish border and the terminal margin is narrowly bordered with black.

♀ : This is similar to the male, but is of dull, non-metallic blue colour, and with marginal black spots on the upperside of the hind wing. The black costal and terminal margins on the upperside of the hind wing are also much broader.

♂ ♀ : The underside is *dark brown* (faded in the present specimen into a pale creamy brown), with both the wings bearing *slender white lines* more or less interrupted into short streaks. The underside of the hind wing bears nine broken and irregular lines. Posteriorly, a small but distinct black spot edged with dark brown on the inside is present

PLATE XXVII

PLATE XXVII

Fig. 1. *Jamides bochus bochus* Cramer (x 1 ½).

" 2. *Jamides celeno celeno* Cramer (x 1 ½).

" 3. *Jamides elpis eurysaces* Fruhstorfer (x 1 ½).

" 4. *Nacaduba nora* Felder (x 1 ½).

" 5. *Nacaduba norela hampsoni* De Niceville (x 1 ½).

" 6. *Curetis thetis* Drury (male, natural size).

" 7. *Curetis thetis* Drury (female, natural size).

" 8. *Iraota timoleon timoleon* (Stoll) (natural size).

" 9. *Amblypodia amantes amantes* Hewitson (natural size).

" 10. *Amblypodia bazaloides* Hewitson (natural size).

" 11. *Loxura atymnus arcuata* Moore (natural size).

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in interspace 1 between the subterminal pair of lines, and in interspace 2, there is a much larger round black spot.

The antennae, head, thorax and abdomen are black in both the sexes.

Expanse : 25 - 34 mm. But Bingham cites 34 - 38 mm. as the measurement for this species.

Range : India, Burma and Ceylon, except in very dry regions. Also extending to Australia and Malayan Subregion.

Habits : This is a common species, but differs in habits and appearance from the other species of this genus. In South India it is common in the hills at elevations up to about 7000 feet. It flies very swiftly, and frequently settles on leaves. The males rest on damp patches of ground, but the females are more generally found higher up among bushes and trees.

Jamides celeno celeno Cramer.

The Common Cerulean.

Plate XXVII, fig. 2.

Specimens in the collection : Six, Madras and Bangalore : 35 mm. of these three are unfortunately damaged with portions of the wings mutilated.

Description : ♂ : The upperside is pale bluish white. On the forewing, the terminal margin is narrowly bordered with black, which broadens slightly towards the apex to a width of 1 or 2 mm. The upperside of the hind wing is uniformly pale bluish white with a slender marginal black line, edged on the inside by a faint white line, and within this is a row of black spots of which the one in interspace 2 is large and well marked.

The underside is greyish brown with the forewing traversed by seven white lines and the hind wing by nine white lines. In the dry season form, to which the present specimens belong, the areas between these white lines are filled in to form dark bands. On the underside of the hind wing there is a large, subterminal black spot in the interspace below vein 2, edged with brownish orange on the inside. A terminal white and a marginal white line are present. The hind wing is tailed, the tail being black and tipped with white.

♀ : On the upperside, the wings are white, or paler than in the male, and the terminal black border, is much broader, especially at the apex. On the hind wing the costal margin bears a broad, black margin and there are post-discal lunulate spots followed by black spots on the outer side. The underside is much paler than in the male.

The antennae are brownish black, and the head, thorax, and abdomen pale brown, tinged with blue on the thorax and base of abdomen in both the sexes.

Expanse : 27 - 40 mm.

Range : India, Ceylon and Burma; this is the range of the species as a whole, but the present race, *celeno* is the typical South Indian form.

Habits : This species is subject to considerable variation in its colour and markings. It is a common species found throughout India almost in any type of country both on the hills and in the plains, except in very dry and desert regions in the north. It is common in South India up to an altitude of 6,500 feet. It is a sunshine-loving species and often comes out in the open, but its flight is weak and it keeps low among the bushes, frequently resting on leaves and damp patches of ground. The food plants are mainly leguminous. The wet season form is very similar to the dry season form described above, but the ground colour is darker and the black margin of the forewing is broader.

Jamides elpis eurysaces Fruhstorfer.

The Glistening Cerulean.

Plate XXVII, fig. 3.

Specimens in the collection : One, Coorg; 34 mm. The present specimen belongs to the wet season brood, described below.

Description : ♂ : The upperside is azure blue which becomes darker towards the apex of the forewing. On the forewing, there is a narrow black terminal border which broadens towards the apex. On the hind wing the ground colour becomes paler towards the costal and dorsal margins. A subterminal series of black spots, bordered on the outside with white are present. The underside is greyish brown, traversed by white lines. In addition, two subterminal and a terminal white transverse line are present in each wing followed by a marginal anticiliary black line.

♀ : The upperside is pale blue with a purplish tinge. The costal and terminal margins are heavily bordered with black. On the hind wing the markings are as in the male, but the spots are larger. The underside is as in the male.

The antennae, head, thorax and abdomen are dark brown and below the thorax and abdomen are white in both the sexes.

Dry season forms are paler, with narrower black border in the forewing in the female.

Expanse : 32 - 40 mm.

Range : The range of the species as a whole extends over Sikkim, Bhutan, Bengal, Assam, Burma, Southern India, the Nilgiris, Coorg, Ceylon, Andamans and Nicobars and even to the Malayan Subregion (including race *kankena*), but the present race, *eurysaces* Fruthstorfer, is the typical South Indian race.

Habits : This is a widely distributed species, but the form *kankena* Felder, from Sikkim, Bhutan, Assam and Burma, is treated as a separate species by Wynter-Blyth,

while Bingham includes it as a race of *Jamides elpis*. If, however, *kankena* is treated as a distinct species, as it should be, in the latest scheme of classification, the range of the species *elpis* becomes more restricted and would be confined to South India, Ceylon and Andamans and the form met with in South India is separated as a distinct race, *eurysaces* to which the present specimen from Coorg belongs. The habits of this species resemble those of the preceding species. The larvae feed on the flowers and seeds of cultivated cardamon.

Genus **Nacaduba** Moore.

This genus includes the butterflies popularly known as the Line Blues. They are either tailed or tailless, and the underside of the wings is generally brown. The wings are traversed by white, paired lines.

♂ ♀ : On the forewing the costa is widely arched. The termen is convex and the dorsum straight. The cell is about half the length of the wing. The hind wing is more or less triangular with a widely arched costa, a blunt apex and a slightly convex termen. The cell is short. The antennae are short, with the club gradually enlarged.

♂ : The upperside is dark blue or violet with narrow dark borders.

♀ : The upperside of the forewing is pale blue or purple or whitish in the discal area, with broad, dark brown borders, or it may be brown throughout.

Although about half a dozen species of this genus are known from South India, unfortunately only two of them are represented in the Museum collection, but one of these two, *N. noreia*, is said to be very rare. It is difficulty to distinguish the species of this genus one from the other.

Nacaduba nora Felder.

The Common Line Blue.

Plate XXVII, fig. 4.

Specimens in the collection : Five, Madras 23 mm.

Description : This species is referred to under the name of *Nacaduba ardates* Moore, by Bingham in his volume on Lycaenidae in the Fauna of British India series. In this species the hind wings are tailed.

♂ : The upperside is purplish brown,sometimes simply brownish. Both the fore and hind wings bear slender marginal black lines. The hind wing bears a subterminal black spot in interspace 2 in most specimens. The underside is brownish and on the forewing bears a series of fine striae in pairs narrowly bordered on the inside with fuscous brown. The discal pair are irregular and appear sinuous. The basal and discal bands are normally continued to vein 1.

The underside of the hind wing bears numerous pairs of white striae, edged on the inside with dark brown, but broken and irregular, and a prominent round subterminal black spot in interspace 2. A double subterminal series of dark linear or lunulate spots are present onthe underside of both the fore and hind wings.

♀ : The upperside is purplish brown with the wings as in the male, but with an iridescent bluish gloss on the forewing from the base to the disc, and on the hind wing there is a slender marginal white line inside the usual anticiliary black line. a subterminal double black spot in interspace 1 and a similar larger single spot in interspace 2 are present. On the underside, the ground colour is paler and brighter than in the male, with the markings similar.

The antennae, head, thorax and abdomen are dark brown in both the sexes.

Expanse : 18 - 25 mm.

Range : Throughout India, Burma and Ceylon, extending to Andamans and Nicobars, but not found in desert tracts.

Habits : This species is subject to considerable variation in respect of the markings on the underside. The underside may be dark brown with white lines or yellowish or grey with dark bands. This is a common species found on the hills as well as on the plains. It ascends to an altitude of about 8,500 feet in the hills. Its flight is strong and rapid. The males often settle on damp patches in large numbers. They are particularly attracted to cattle droppings in the vicinity of streams and marshes. The females keep to the wooded parts and do not come out into the open. The food plant of the larvae of this species is *Acacia caesia*- a leguminous plant.

Nacaduba noreia hampsoni De Niceville.

The White-tipped Line Blue.

Plate XXVII, fig. 5.

Specimens in the collection : One, Nilgiris; 22 mm.

Description : This species was originally described as a geographical form of *N. nora*, but is sufficiently distinct to be ranked as a species.

♂ ♀ : The upperside of both the wings is dark brown. The forewing bears a fringe which is white at the apex. The basal patch on the forewing is sub triangular. On the hind wing the basal patch is bluish violet. The underside of both the wings is pale whitish brown with a discocellular spot in each wing and with a number of rows of spots, most of them encircled with white. There is a fuscous brown marginal line and a whitish anticiliary line interrupted by brown spots at the tips of the veins. On the underside of the forewing the basal band is confined to the cell.

Expanse : 22 - 28 mm.

Range : The range of the species extends over Ceylon, South India and Peninsular India up to Madhya Pradesh and Mussooree, but Bingham cites "Ceylon" as the only locality for this species. The present race, *hampsoni*, is the South Indian race of this species.

Habits : This is a very rare species. It inhabits thickly wooded regions in the hills from low to moderate elevations. Its habits are more or less similar to those of the preceding and other species of *Nacaduba*.

Subfamily **THECLINAE.**

The Strong Blues.

This subfamily includes robustly built butterflies endowed with ability to fly strongly and steadily. The hind wings are often lobed, and bear one or more tails which may either be short or long, and either thin and thread-like or fluffy. The colour and patterns of colour on the wings are very varied, but usually the upperside of the wings is blue or purple. The males generally bear a sex brand on the upperside of the hind wing near the base.

Genus **Curetis** Hübner.

This genus includes medium - sized, often brightly coloured butterflies popularly known as the Sunbeams. The hind wings are not tailed. The upperside in the males is red with black borders, while in the females it is white or orange with black borders. The underside is glossy white in both the sexes.

♂ : On the forewing the costa is arched and the termen straight or sometimes even slightly concave. The apex of the forewing is more or less acutely pointed. The dorsum is slightly sinuate and the tornus is in the form of a sharply marked right angle. The cell is about half the length of the wing.

♀ : On the hind wing, the apex is blunt and obtuse and the costa arched. The termen is rounded, convex and the tornus is more or less rounded or obtusely angled. The dorsum is slightly convex. The cell is about half the length of the wing.

The antennae are short, less than half the length of the wing, without well defined club.

Of the three Indian species of this genus, only one, *C. thetis* Drury, is represented in the Museum collection. One specimen in the collection, labelled *C. aesopus* Fabricius, is also correctly referable to *C. thetis*, as *C. aesopus* Fabricius, is a synonym of *C. thetis*.

Curetis thetis Drury.

The Indian Sunbeam.

Plate XXVII, figs. 6 & 7.

Specimens in the collection : Eight, four males and four females; 38 mm. One male specimen is from Coorg, and another male is from Malabar. The locality of the remaining specimens is not recorded. The smallest specimen (36 mm.) is 4 mm. smaller than the minimum recorded expanse.

Description : ♂ : The upperside is dark brick-red, highly glossy. On the forewing, the base is covered with dusky scales. The costal and terminal margins are bordered with black, this border broadening considerably over the apical area. On the hind wing the base is covered with dusky scales over a wide area. The costal and dorsal margins bear a broad, pale, almost white, band. The termen is narrowly bordered with black. The underside is glossy silvery white. The whole under surfaces of both the wings are traversed by discal and marginal dark lines parallel to one another and to the termen, and these are composed of short lines.

♀ : The upperside is white with broad, dark borders on both wings, these borders being particularly broad in the wet season forms, reducing the ground colour to discal patches of white. The upperside of the hind wing is pale dusky black with a smaller discal patch and a darker, broad brownish black streak extending from the base outwards, broadening there into a rounded patch beyond which is the white discal patch mentioned above. The underside is as in the male, but with the markings more indistinct.

The antennae, head, thorax and abdomen are dusky black, the antennae being reddish at the apex.

The present specimens belong to the variety *arcuata* Moore, which is the typical South Indian form recorded from Malabar and Anamalai Hills. The ground colour in this form is slightly paler than in the North Indian form.

Expanse : 40 -48 mm.

Range : Ceylon, Peninsular India (except in desert regions); Assam, Bengal, Burma and Java.

Habits : This species is widely distributed over Ceylon and Peninsular India in the wetter regions. Their flight is powerful. They often bask in the sunshine with the wings partly open. The males frequently settle on the higher branches of trees while the females rest on leaves and branches nearer the ground. This species is confined to scrub jungles in the plains or on the hills at low altitudes.

Genus **Iraota** Moore.

This genus includes bright, glossy blue butterflies of medium size, popularly known as the Silver streak Blues.

Only a single species, *Iraota timoleon* (Stoll) is recorded from South India and this is represented in the Museum collection by the typical South Indian race, *timoleon* (Stoll).

Iraota timoleon timoleon (Stoll).

The Silverstreak Blue.

Plate XXVII, fig. 8.

Specimens in the collection : One; the edges of its wings are badly damaged and frayed out and its locality is not recorded; 40 mm.

Description : ♂ : The upperside is bright glossy blue or greenish blue with broad black borders on both the wings, this black border being especially well marked over the apex of the forewing. The underside is dark reddish brown with a silvery white streak in the cell of the forewing and a series of discal spots. The underside of the hind wing is generally ochreous brown towards the margin, and usually bears a broad, irregular streak over the basal area; this streak varies from silvery white to reddish brown. Faint zig-zag markings are present on the discal area. The hind wing is tailed at the termination of vein 1.

♀ : The upperside is dark brown with the discal patch glossy purple on the forewing. The upperside of the hind wing sometimes bears a small central patch of purplish scales. The hind wing bears an additional tail at vein 2. The underside is similar to that of the male. The purple of the discal areas is replaced by greenish tint in the South Indian race to which the single specimen in the collection belongs.

Expanse : 40 - 48 mm.

Range : Ceylon, Peninsular India, from South India to Madhya Pradesh; Calcutta, Lucknow, Simla, Assam and Burma.

Habits : This species frequents trees with dense foliage. Its flight is very fast, but it does not fly long distances at a stretch. It is especially common among the foliage of Banyan which is one of its food plants. It is chiefly found at low elevations in hilly regions having plenty of rainfall. In the South Indian race, the glossy patches on the wings are greenish rather than purplish. The larvae feed on the leaves and shoots of the Banyan, Peepal and Pomegranate. In the present specimen the wings are so badly faded that only traces of the glossy greenish patches can be made out on the discal areas of the wings.

Genus **Amblypodia** Horsfield.

This genus includes a large number of species of brightly coloured butterflies commonly known as the Oakblues. Some of the species are among the largest and most

brilliantly coloured of all Indian specis of Lycaenidae. These butteflies are easily distinguished by the upperside of the wings in all the males being brilliant glossy blue or purple (except in one species in which it is metallic green). In almost all the species, the wings have dark borders, which are broader in the females. The underside of the wings is greyish or brownish with numerous dark spots. Most of the species are tailed.

This is a large genus of which about 80 species have been recorded from the Indian region. Most of them are from Sikkim and Assam area. Some extend southwards to the Western Ghats and Ceylon. Only two species are represented in the Museum collection.

Amblypodia amantes amantes Hewitson.

The Large Oakblue.

Plate XXVII, fig. 9.

Specimens in the collection: Two, one from Mysore and the other from Nilgris; 51 mm.

Description : ♂ : The upperside is brilliant, dark, shining blue, with a narrow black border about one millimetre in width. The costa on the forewings is widely arched, the termen is straight and the dorsum slightly concavely arched. The apex is more or less acute and pointed.

♀ : The upperside is paler than that of the male, with the black borders much broader.

♂ ♀ : The underside is greyish or greyish brown with brown spots and bands of spots arranged in a characteristic manner. The underside of the hind wing bears a patch of diffuse metallic green scales on the tornus. The hind wing is lobed and tailed.

Expanse : 45-57 mm.

Range : The range of the species as a whole extends over Ceylon, South India to Madhya Pradesh, South Bihar, and also to Assam and Burma. The race *amantes* is the typical South Indian form to which the present specimens belong.

Habits : This is a large and handsomely coloured species of the Indian butterfly; it is one of the largest and most brilliantly coloured species among the Blues (Lycaenidae). They are restricted entirely to the jungles or to shady and sheltered situations in the vicinity of the jungles. They inhabit low or moderate elevations where the rainfall is heavy. They are mostly found hiding away among the leaves and bushes and they do not fly much, but when they do fly, their flight is extremely fast and strong. They do not visit flowers, but the males may be found basking in the sunshine with the wings partially closed. This species is locally common and frequents nutmeg and cinnamon gardens.

Amblypodia bazaloides Hewitson.

The Tamil Oakblue.

Plate XXVII, fig. 10.

Specimens in the collection : One, with the left hind wing mutilated; 40 mm. Its exact locality is not recorded.

Description : ♂ ♀ : The costa on the forewing is broadly arched, the termen more or less straight and the dorsum slightly concave. The apex is pointed. On the hind wing the termen is convexly rounded and the dorsum slightly convex.

♂ : The upperside is purple, and the forewing bears a narrow black border about 2 to 3 mm. wide at the apex and tornus.

♀ : The upperside is purple, but paler than in the male. The dark border is about 4 mm. wide along the dorsum and very broad at the apex. On the hind wing, the cell is purple.

♂ ♀ : The underside is dark chocolate coloured with the apex of the forewing and the region inside the wavy marginal line and below vein 8 on the hind wing overlaid with white scales. On the forewing in interspace 3 is a discal spot confluent with the spot at the end of the cell. The markings on the underside of the forewing are boldely outlined with white. On the underside of the hind wing, the basal, central and discal spots in interspace 7 and the spot in interspace 6 are conspicuously chocolate-coloured.

Expanse : 44 - 47 mm.

Range : Western Ghats, Assam to Burma.

Habits : This species is very rare in South India, where it is confined to the densely wooded parts of the Western Ghats where there is plenty of rainfall. But it is said to be common in the Naga hills of Assam. Its habits are more or less similar to those of the preceding species.

Genus **Loxura** Horsfied.

This genus includes bright, orange-yellow butterflies with the hind wing produced and ending in a conspicuous tail. They are popularly known as the Yamflies.

The single Indian species of this genus, *Luxura atymnus* (Cramer) is represented in the collection by two races, namely, the typical form, *Loxura atymnus arcuata* Moore, and *Loxura atymnus surya* Moore. The latter is distinguished from the former by the upperside being dark brown instead of orange, and the forewing bearing a discal oval patch of orange.

Loxura atymnus arcuata Moore.

The Yamfly.

Plate XXVII, fig. 11.

Specimens in the collection : Two, of which one is from South Coorg; 36 mm. The locality of the other specimen is not recorded.

Description : ♂ ♀ : The upperside is orange, the forewing bearing a broad, black border which widens into a wide, triangular patch over the apex of the forewing. The upperside of the hind wing is also orange, but the black border is narrower or absent. The hind wing is produced behind at the tornus which ends in a long tail.

The underside of the wings is much paler and yellowish with pale brown transverse bands. Only one of these bands (in the post-discal area) is distinct and continuous; the others within this are broken and obscure.

Expanse : 36 - 40 mm.

Range : Ceylon, South India, Orissa, South Bihar, Central India, Himalayas, from Mussooree to Assam; Bengal and Burma.

Habits : This species is common in places with plenty of rainfall at low elevations. It is common especially in bamboo jungle. Its flight is weak, and it settles frequently on the leaves and stems of low bushes and trees. It often flies close to the ground. This species is subject to considerable variation. The food plant of the larvae is a species of Yam, hence the popular name Yamflies. The larvae are attended by red ants.

Loxura atymnus surya Moore.

The Yamfly.

Plate XXVIII, fig. 1.

Specimens in the collection : One Trivandrum, 32 mm.

Description : ♂ ♀ : As mentioned above, in this race the upperside is blackish brown with a discal oval orange-yellow patch on the forewings. The upperside of the hind wing is uniformly dark brownish. The hind wing is produced to the tornus which terminates in a long tail as in the preceding race.

The underside is uniformly pale yellowish with only a very faint indication of a transverse, narrow, post-discal pale brown band.

The expanse of wings, range of distribution and habits are more or less the same as that of the typical form described above. More specimens have to be examined before the identifiction of the present specimen can be confirmed.

PLATE XXVIII

PLATE XXVIII

Fig. 1. *Loxura atymnus surya* Moore (natural size).

" 2. *Spindasis vulcanus vulcanus* Fabricius (natural size).

" 3. *Spindasis schistacea schistacea* Moore (natural size).

" 4. *Spindasis ictis ictis* Hewitson (natrual size).

" 5. *Spindasis lohita lazularia* Moore (natural size).

" 6. *Zesius chrysomallus* Hübner (natural size).

" 7. *Tajuria cippus cippus* (Fabricius) (male, natuiral size)

" 8. *Tajuria cippus cippus* (Fabricius) (female, natural size).

" 9. *Cheritra freja jaffra* Butler (natural size).

" 10. *Rathinda amor* (Fabricius) (x 1 ½).

" 11. *Catapoecelima elegans myositana* Fruhstorfer (natural size).

" 12. *Deudoryx epijarbas epijarbas* (Moore) (natural size).

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Genus **Spindasis** Wallengren.

This genus includes dark brown butterflies popularly known as the Silverlines. The upperside of the wings is dark brown, with or without tawny markings on the forewings. The males usually bear a brilliant deep blue sheen on the upperside of both the wings. The wings of the females do not bear this glossy lustre, and the forewings in the females are broader and more rounded. The underside in both sexes is pale coloured with darker broad bars with silver-coloured centres, but in the dry season forms these bars may be reduced to mere narrow silvery streaks. The hind wings are tailed at the terminations of veins 2 and 1 b.

These butterflies inhabit almost every part of India, and may be found in thick jungle as well as in open plains and in dry as well as wet regions. They ascend up the hills to an altitude of 8000 feet. Their flight is extremely rapid, but they frequently settle on damp patches of ground, resting with the wings closed over the back.

Although about half a dozen species have been recorded in South India and Ceylon, only four of them are represented in the Museum collection.

Spindasis vulcanus vulcanus Fabricius.

The Common Silverline

Plate XXVIII, fig. 2.

Specimens in the collection : One, Coorg; 34 mm.

Description : ♂ ♀ : The upperside of the wing is dark brown with conspicuous, black-spotted, orange-yellow, transverse bands. In the male, the upperside is faintly suffused with a bluish gloss, and in the female the leaden-coloured scaling is absent. On the upperside of the hind wing the tornal area is bright yellowish with two conspicuous rounded black marginal spots.

The underside is pale yellow with prominent black-bordered reddish bands. The underside of the forewing bears a basal streak along the costa to the central cell bar, and the underside of the hind wing bears a continuous outer basal streak and a spot beyond. This streak may be absent in the dry season form.

Expanse : 26 - 34 mm.

Range : The species *vulcanus* ranges over the whole of India and Ceylon, but the present race, *vulcanus* Fabricius is the typical South Indian form.

Habits : This is the commonest species of this genus. It is found all over India except in the desert regions and it ascends the hills up to an altitude of 8000 feet. It is generally found gregariously in open plains and sparsely wooded localities. It often settles on leaves and flowers in gardens. The larvae are attended by tree ants of the genus *Crematogaster*. Bell has given a good account of the early stages of the life history of this species.

Spindasis schistacea schitsacea Moore.

The Plumbeous Silverline.

Plate XXVIII, fig. 3.

Specimens in the collection : One, 32 mm. The wings of this speimen are unfortunately badly torn and the exact locality is not recorded.

Description : ♂ : The upperside is dark brown, with the orange-yellow areas on the forewing more restricted than in the preceding species. The entire surface of the forewing is suffused with dark scales. The upperside of the hind wing is shot with bluish gloss.

♀ : The upperside is dark brown with orange areas on the forewing. The upperside of the hind wing and the area near the dorsum on the upperside of the forewing are suffused with leaden-coloured scales.

The underside is more or less as in the preceding species, but with two conspicuous, yellow-ringed, black, rounded marginal spots over the tornal area at the bases of the tails of the hind wing.

Expanse : 28 - 37 mm.

Range : Ceylon and South India. The species *schistacea* is recorded from Ceylon and several localities in Peninsular India, but the present race *schistacea* Moore, is the typical South Indian form occurring especially in the hills, including the Nilgiris. It is common in Coorg.

Habits : This species is readily distinguished from the other species of the genus by the bluish gloss on the upperside of the hind wing of the male being lighter. Its habits are more or less similar to those of the preceding species.

Spindasis ictis ictis Hewitson.

The Common Shot Silverline.

Plate XXVIII, fig. 4.

Specimens in the collection : Two, Bangalore, 29 mm. One of these is badly damaged.

Description : ♂ ♀ : The upperside is brownish, shot with blue, although it is faded to a uniform dull brown in the present specimens. The upperside of the forewing bears a well defined triangular orange patch. In the male, on the upperside of the forewing, the blue shot area does not extend above vein 2. In the female, the upperside of the wings is overlaid with leaden-coloured scales.

On the underside, the wings are pale tawny yellow with darker, silver-centered, broad bars, the outer basal band among these being broken into three spots. The markings on the underside are more or less similar to those of the two preceding species.

Expanse : 27 - 35 mm.

Range : The range of the species as a whole extends all over India and Ceylon, but the present race *ictis* Hewitson, is the typical race common in South India.

Habits : This species is locally common being more or less restricted to the more open plains and hills at low elevations. It does not, as a rule, frequent forest or well wooded localities, but is found more especially in the drier regions. It is widely distributed species, exhibiting considerable seasonal and individual variation.

Spindasis lohita lazularia Moore.

The Long-banded Silverline.

Plate XXVIII, fig. 5.

Specimens in the collection : Two, 32 mm. Of these, one is badly damaged. Their exact locality is not recorded, but both belong to the race *lazularia Moore*, which is the typical form found in Ceylon and South India.

Description : ♂ ♀ : The upperside is dark brown, without orange patches. On the upperside of the hind wing the tornal area is bright yellowish orange, bearing a rounded black spot and another much smaller black spot close to it marginally, at the base of the tail. In the male, the upperside is brown, shot with blue, but in the female, it is uniformly dull brown.

The underside is creamy yellow or darker, varying to cinnamon red, with the bands varying from red to black. On the underside of the forewing, the basal markings consist of a bar across the cell connected to the base by a narrow streak above the cell. On the underside of the hind wing the outer basal band is continued along vein 1b and is connected to the lower end of the central band.

Expanse : 30 - 42 mm.

Range : The range of the species as a whole is wide, extending over Northern India, from Mussoorie to Assam and Burma, Calcutta, Ceylon and South India, but as mentioned above the present race *lazularia* Moore is the typical southern form occurring in South India and Ceylon.

Habits : This is a typical species of the forested areas inhabiting thickly wooded regions having plenty of rainfall. It is a sunshine-loving species, capable of flying very swiftly. It frequently settles on leaves and flowers. In the Himalayas (where the northern form of the species occurs) it is found up to an altitude of 5000 feet. It is very common in the South and North Canara districts where the rainfall is too heavy for other species of this genus

Genus **Zesius** Hübner.

This genus includes the butterflies popularly known as the Redspots. The upperside is reddish brown, with the hind wing bearing two red-crowned black spots over the tornus. Only a single Indian species is known, and this is represented in the Museum collection.

Zesius chrysomallus Hübner.

The Redspot.

Plate XXVIII, fig. 6.

Specimens in the collection : Two, rather badly preserved specimens; one of these is from Trivandrum and the other from Malabar; 35 mm.

Description : ♂ : The upperside is coppery red (faded in the present specimens into a dark brown) with a narrow black border. The upperside of the hind wing bears two tornal black spots edged with red. The hind wing bears two tails.

♀ : The upper surface is pale blue with dark brown borders. The hind wing bears tornal spots as in the male, but has three tails.

♂ ♀ : The underside is pale grey with a discal band of loosely connected spots. The black spot in interspace 2 is crowned with red.

Expanse : 38 - 44 mm.

Range : Ceylon and Peninsular India. Also Northern India, in Bengal, South Bihar and Orissa.

Habits : This is a widely distributed species occurring all over Peninsular India and Ceylon. It is mostly confined to thicky forested country at low elevations where there is plenty of rainfall. Its flight is rapid. The males settle on leaves and stems high up on the bushes and trees. The female is more retiring and seldom comes out of dense foliage. The larvae are associated with red ants, and often devour other larvae of the same species.

Genus **Tajuria** Moore.

This genus includes moderately large butterflies popularly known as the "Royals". The upperside is bluish, broadly bordered with black over the apical and marginal areas of the forewing; the blue is usually duller and paler in the female. The underside is generally pale grey, white or brownish, bearing an outer discal narrow band. The underside of the hind wing bears two orange-crowned black spots at the tornus. The hind wing bears two thread-like tails.

Although about seventeen species are known in India, most of them are confined to the Assam, Sikkim and Burma regions and at least about half dozen of them are very rare.

Of the three species recorded from South India, only one is represented in the Museum collection.

Tajuria cippus cippus (Fabricius).

The Peacock Royal.

Plate XXVIII, figs. 7 & 8.

Specimens in the collection : Three, rather poorly preserved; one is from Malabar, but the locality of the other two specimens is not recorded; 36 mm.

Description : ♂ : The upperside is dark glossy greenish blue with the apex bearing a broad, black patch.

♀ : The upperside is greyish blue, the bluish area being more extensive on the forewing and becoming whitish outwardly on the forewing.

♂ ♀ : The fringe is light brown or with the long hairs only being white. The underside is pale grey, varying to almost white. On the underside of the forewing, the outer discal line is nearer to the termen than the tip of the cell, and is interrupted or sometimes absent. On the underside of the hind wing the outer discal line is broken at veins 3 and 4.

Expanse : 31 - 45 mm.

Range : Ceylon, India and Burma.

Habits : This species is found almost everywhere except in dry and desert regions. It chiefly inhabits low elevations. It is found wherever its food plant, *Loranthus*, grows. In Ceylon, this species has been found in orange and lime plantation where the trees become infested with *Loranthus*. The males visit flowers. The present race, *cippus* is the typical Southern form.

Genus **Cheritra** Moore.

This genus includes dark brown butterflies popularly known as the Imperials. Each of the hind wings bears two tails, a long one and a shorter one. The upperside is dark brown with a purple tinge in the male. The hind wing bears a conspicuous white tornal area bearing black spots. The underside bears faint bars at the end of the cell, and the hind wing bears discal and submarginal lines and black tornal spots.

Only a single Indian species, the Common Imperial, is known, and this is represented in the Museum collection.

Cheritra freja jaffra Butler.

The Common Imperial.

Plate XXVIII, fig. 9.

Specimens in the collection : Two, Travancore. One of these specimens is incomplete, with the right forewing missing. The expanse of the complete specimen is 31 mm.

Description : ♂ ♀ : The upperside is dark brown, tinged with purple in the male. The tornal area of the hind wing is white, bearing black spots. The upperside of the forewing is uniformly dark brown, unmarked. The underside is white to pale brown, with faint bars at the ends of the cells. The underside of the hind wing bears discal and submarginal lines and tornal black spots which are crowned with metallic scales. The hind wing bears a long tail about 22 mm. long at vein 2 and a shorter one about 5 mm. long at vein 1 b.

In the present race, *jaffra*, which is the typical South Indian race, the white area on the upperside of the hind wing is more extensive, and the discal line on the underside of the forewing is regular and continuous.

Expanse : 38 - 46 mm.

Range : Ceylon, South India, Western Ghats, Himalayas, Kumaon to Assam; Burma. This is the range of the entire species, but the present race *jaffra* is the Southern form.

Habits : This is essentially a hill species, being confined to thick jungle. Its flight is weak, and it usually keeps to the edges of jungles. In South India, the present race, *jaffra*, is confined to the Western Ghats and other hills in South India, up to an altitude of 2500 feet.

Genus **Rathinda** Moore

This genus includes somewhat small, dark brown butterflies, inhabiting thickly forested regions. They are popularly known as the Monkey Puzzles. The upperside of the forewing is marked with small spots forming interrupted bands. The single Indian species of this genus, *Rathinda amor* (Fabricius), is represented in the collection.

Rathinda amor (Fabricius)

The Monkey Puzzle.

Plate XXVIII, fig. 10.

Specimens in the collection : Four, three of which are from Ganjam, Madras and Trivandrum; 27 mm. The locality of the fourth specimen is not recorded. The specimen from Trivandrum is incomplete, the wings on one side having been damaged.

Description : ♂ ♀ : The upperside is dark brown. The upperside of the forewing bears a spot at the end of the cell and usually smaller spots in interspace 2 and 3 forming

a short, white, oblique band. The upperside of the hind wing bears two black tornal spots and a narrow, dark reddish band of spots above them, but these are faded and merged into the dark brown ground colour in the present specimen.

The underside is paler, varying from dark yellowish brown to almost plain white; on the underside of the forewing, the apical area is dark brown, the basal area bears dark markings, and the discal area a curved white line.

The underside of the hind wing bears irregular dark spots and lines and a silvery marginal line. The hind wing bears three tails at the terminations of veins 1, 2, and 3. Of these, the middle tail is the longest.

Expanse : 26 - 28 mm.

Range : Ceylon and South India. In North India this species has been recorded from Calcutta, Orissa and Assam.

Habits : This species inhabits heavy jungle on the plains or in the foothills at low elevations in regions having plenty of rainfall. Their flight is weak and unsteady, and always close to the ground. They frequently settle on leaves in the undergrowth. The larva is peculiar in being covered with long, fleshy outgrowths.

Genus **Catapoeceilma** Butler.

This genus includes purplish blue butterflies with dark apical areas on the forewing, and commonly known as the Tinsels. Of the three known Indian species, only one is common and found in South India and Ceylon, as well as in the Assam area, and this is represented in the Museum collection by the South Indian race.

Catapoeceilma elegans myositina Fruhstorfer.

The Common Tinsel.

plate XXVIII, fig.11.

Specimens in the collection : Two, one of which is from Coorg and the other from the Nilgiris; 30 mm.

Description : ♂ : The upperside is dark violet-blue, with dark borders on both the wings, the border over the apical area of the forewing being broader and more extensive.

♀ : The upper side is paler, with the dark borders on the wings broader.

♂ ♀ : The underside is greyish brown, with irregular black and silver-edged brownish yellow bands and spots. The hind wing bears three tails at the terminations of veins 1, 2 and 3, the middle tail being the longest.

Expanse : 28 - 32 mm.

Range : This species has more or less the same distribution as the preceding species, being found in Ceylon, South India, Orissa and in the Himalayas from Mussoorie to Assam and Burma. But the present race, *myositina* Fruhstorfer, is the Ceylon and South Indian race.

Habits : This species is found in thick as well as open jungle in hilly areas up to an altitude of 5000 feet. Its flight is fairly strong. It frequently settles on bare twigs, but never visits flowers. In South India, this species is reported to be locally common in the Nilgiris between 2000 and 4000 feet, and in the Shevroy Hills it is said to be common in the orange plantations where it frequently settles on the leaves. The females are the ones that are most frequently seen, the males being more retiring in their habits.

Genus **Deudoryx** Hewitson.

This genus includes butterflies with the upperside of the wings conspicuously reddish with dark brown borders along the costa and termen. They are popularly known as the Cornelians. The costa and termen of the forewing is more or less straight so that the forewing is more or less in the form of a strictly straight-sided triangle. Of the two recorded Indian species of this genus, only one is found in South India and Ceylon, and this is represented in the collection by the typical South Indian race.

Deudoryx epijarbas epijarbas (Moore).

The Cornelian.

Plate XXVIII, fig. 12.

Specimens in the collection : Six, mostly from Trivandrum and South Coorg; 36 mm. Of these, two are females.

Description : ♂ : The upperside is red, with the forewing bearing dark brown borders on the costal and terminal margins. The cell is marked black. On the upperside of the hind wing the basal portion of the costal area is dark.

♀ : The upperside is brown, with the discal area on the forewing usually paler.

♂ ♀ : The underside is brown, varying from pale brown to dark brown with broad bands in the cell edged with white, and a white-edged band on the discal area. The hind wing bears a single, slender tail at the termination of vein 2, and on the underside, bears a black spot in interspace 2, encircled with a yellow ring.

Expanse : 34 - 44 mm

Range : The range of the species as a whole extends over Ceylon, throuh out India, except in the very dry regions, and Burma, but the present race, *epijarbas*, is the typical Southern form.

Habits : This species is widely distributed, being found both on the plains and on the hills at low elevations, in well wooded areas as well as open country. Its flight is very

rapid, but the males as well as the females frequently visit flowers and settle on patches of moist ground. The larvae are found on various fruits such as the Pomegranate.

Genus **Virachola** Moore.

This genus includes butterflies which are fairly large among the Blues, popularly known as the Guava Blues, as the Guava is one of the food plants of the larva of the species belonging to this genus. They are dull violet-blue on the upperside, with the costa and termen of the forwing more or less straight, and the apex rather blunt.

Of the two Indian species (both of which are known from South India), only one, namely *Virachola isocrates* (Fabricius) which is the commoner one, is represented in the Museum collection.

Virachola isocrates (Fabricius).

The Common Guava Blue.

Plate XXIX, fig. 1.

Specimens in the collection : Three, fairly well preserved specimens; 41 mm. Two of them are from the Nilgiris, while the locality of the third one is not recorded.

Description : ♂ : The upperside is dull violet-blue, shot with a brilliant suffusion of the same colour. The upperside of the hind wing bears a sex brand.

♀ : The upperside is brown, the area towards the end of the cell on the forewing being darker brown; beyond this there is an orange discal patch. The upperside of the hind wing bears a conspicuous black tornal spot in interspace 2, crowned with an orange patch. Below this black spot, there is a faint indication of another similar black spot, but this is very indistinct. These are much larger than the males.

♂ ♀ : The underside is pale grey, with the markings slightly darker greyish brown. The discal band on the underside of the forewing is straight. The hind wing bears a slender tail at the termination of vein 2.

Expanse : 34 - 50 mm.

Range : Ceylon, India and Burma (Northern Shan States)

Habits : This species is widely distributed and is commonly found everywhere in India except in the very dry, desert regions. It is most abundant in the open plains having scanty rainfall. Its flight is extremely rapid and powerful, and the wings are often damaged when one attempts to capture them and keep them alive. Both males and females visit flowers and are most frequently found in Guava and Pomegranate plantations. The Guava *(Psidium guava)* is one of the commonest food plants of the larvae of this species. Bell has given a very detailed description of the early stages of this species in one of his serial articles on butterfly life-histories in the Journal of the Bombay Natural History Society. The larvae are found inside the fruits of the food plants.

Genus **Rapala** Moore

This genus includes brightly coloured species of medium-sized butterflies popularly known as the Flashes. The upperside of the wings is of varying shades of red, blue, brown or purple, and often of a brilliant hue in the males. The borders of the forewing are dark. The underside bears a bar at the end of each cell and a discal band on both the wings. The hind wing is lobed and bears a slender tail and a tornal spot. The males have a circular sex brand on the upperside of the hind wing, and there is a corresponding tuft on the dorsum of the forewing close to it, but this tuft may be occasionally absent.

These butterflies normally inhabit hilly country wherever there is plently of rainfall, but a few frequent the open plains. They are found on bushes and leaves and often visit flowers. Their flight is very rapid and straight.

Although there are about sixteen species of this genus recorded in India, most of them are from the Assam, Sikkim and Burma Zone. About three species are recorded from South India, but only one of them is represented in the Museum collection.

Rapala melampus Cramer.

The Indian Red Flash.

Plate XXIX, fig. 2.

Specimens in the collection : Two both males; 35 mm. Their locality is not recorded.

Description : ♂ : The upperside is bright red, brilliantly shot with purple (but this purple suffusion tends to fade badly in preserved specimens, as in the present ones). On the forewing, the costa, apex and termen are rather broadly bordered with black. The terminal black border gradually narrows down to the tornus. There is no black bordering on the dorsum. The upperside of the hind wing is completely red. The hind wing bears a lobe posteriorly, which is overlaid with orange, metallic-coloured scales, and a slender, thread-like tail.

♀ : The upperside is reddish, but much paler than in the male.

♂ ♀ : The underside is slaty grey. There is a black tornal spot in interspace 2, but this is not conspicously crowned with orange as in some of the other species of *Rapala*.

Expanse : 33 - 38 mm.

Range : Ceylon, South India, Bombay, Bihar, Orissa, Kutch and Kumaon. Also doubtfully recorded from Sikkim.

Habits : This is a common species found widely distributed throughout Peninsular India and Northern India, except in the North East and in the desert regions of the north. It occurs more commonly on the plains than on the hills. In the Himalayas, it is mainly met with in the lower elevations. The upperside of the wings in the males resembles that

PLATE XXIX

PLATE XXIX

Fig. 1. *Virachola isocrates* (Fabricius) (natural size).

" 2. *Rapala melampus* Cramer (natural size).

" 3. *Bindahara phocides moorei* Fruhstorfer (natural size).

" 4. *Celaenorrhinus leucocera leucocera* Kolliker (natural size).

" 5. *Tagiades obscurus athos* Plotz (natural size).

" 6. *Tagiades atticus atticus* Fruhstorfer (natural size).

" 7. *Tagiades litigiosa vajuna* Fruhstorfer (natural size).

" 8. *Coladenia dan dan* (Fabricius) (natural size).

" 9. *Coladenia indrani indra* Evans (natural size).

" 10. *Tapena thwaitesi hampsoni* Elwes (natural size).

" 11. *Odontoptilum angulatum* Felder (natural size).

" 12. *Caprona ransonnetti potiphera* Hewitson (natural size).

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of the males of *Deudoryx epijarbas* described above, but the undersides of the males in these two species are quite different.

Genus **Bindahara** Moore

This genus includes dark coloured, medium-sized butterflies, popularly known as the Planes. On the forewing, the costa is broadly arched and the termen straight. The tornal area and the tail in the hind wing are white.

A single Indian species is recorded, with two races, one of which is confined to the Sikkim-Burma zone while the other is found in South India and Ceylon. The latter alone is represented in the collection.

Bindahara phocides moorei Frushtorfer..

The Plane.

Plate XXIX, fig. 3.

Specimens in the collection : One, Nilgiris; 31 mm. This is 7 mm. smaller than the minimum recorded expanse.

Description : ♂ : The upperside is shiny black. On the upperside of the hind wing, the tornal area and the long fluffy tail are yellowish while the outer margin of the tornal area is coloured bright metallic blue. The underside is yellowish brown.

♀ : The upperside is brown, the tornal area of the hind wing and the tail being white. The tornal area of the hind wing bears a large black spot in interspace 2. The underside is white.

♂ ♀ : The underside of the forewing bears a broad dark discal band and a band across the cell, which is dark brown. The underside of the hind wing bears an irregular discal band.

Expanse : 38 - 42 mm.

Range : Ceylon, South India. (This is the range of the present race, moorei.

Habits : This species is confined to thick, evergreen jungles wherever there is heavy rainfall. It is commonly found in the well-wooded slopes of the Western Ghats and the Nilgiris, and in the hilly regions in Ceylon. It flies rapidly especially around the tops of trees, and the males frequently visit flowers. The larvae, as in the case *Deudoryx and Virachola*, are found feeding inside fruits.

Family HESPERIIDAE.

This family includes small, dark brown butterflies, popularly known as the Skippers. They are generally spotted or banded with white or yellow. These marking are often translucent. Their bodies are robust and stoutly built and superficially they almost

resemble moths. Their wings are strongly built and their legs well developed. The antennae are set wide apart and are either hooked or thickly clubbed, tapering to a point at the tip. The head is very broad, being wider than the thorax.

The eggs are dome-shapped, and usually longitudinally ribbed. The larvae are cylindrical, generally greenish, and live in cells made of leaves.

Skippers are essentially insects of well wooded areas and are found most abundantly in the hilly regions of North East India, Assam and Burma. Most of them fly only in the early mornings, and again in the evenings (crepescular). They usually visit flowers, feeding on the nectar, or settle on leaves of trees or bushes, or on damp patches of the ground. They are extremely rapid in their flight, and are thus able to avoid falling an easy prey to their enemies. When resting or basking, their positions vary. Some rest with their wings spread out flat, while others do so with their wings closed over their backs. Some groups (the Ismeninae) always rest on the under surface of leaves.

Although numerous species of this family are known in India, only a comparatively few are represented in the Museum collection. Much more intensive collection of this group will have to be undertaken for filling up the gaps in the existing collection.

This family is divided into a number of subfamilies, based on fairly easily recognizable external characters. All the nine subfamilies of the known Indian Skippers are represented in the Museum collection although some of them are represented only by a very few species.

Subfamily 1. CELAENORRHINAE.

This subfamily includes the Skippers popularly known as the Flats. They are dark brown, small, or medium-sized butterflies with white or yellow semitransparent markings on the forewings. They rest with their wings spread out horizontally against the surface. Their flight is rapid.

Genus **Celaenorrhinus** HÜbner.

The characters are the same as those of the subfamily. About three species are known from South India and one from Ceylon. But only one of the South Indian species is represented in the Museum collection.

Celaenorrhinus leucocera leucocera Kolliker.

The Common Spotted Flat.

Plate XXIX, fig. 4.

Specimens in the collection : Three, two of which are from the Pulney Hills and one from the Nilgiris; 41 mm. This is 5 mm. smaller than the minimum recorded expanse.

Description : ♂ ♀ : The upperside is dark brown, with a broad, discal, white, semitransparent band composed of connected spots on the forewing. The spot at the end

of the cell and in interspace 2 are large, squarish and connected. Small, apical white spots are present on the upperside of the forewing. The upperside of the hind wing bears a few faint, oblique yellowish spots. The cilia are chequered bright orange and brown. The small post-discal spots are conspicuous and coloured bright orange. The underside of the wings are dark brownish and bears the same markings as on the upperside. The antennae in the male are white, while in the female they are brown, with white club.

Expanse : 45 - 55 mm.

Range : The range of the species as a whole extends from South India to Bengal, westwards up to Bombay, northwards to North India, and in the Himalayas from Kashmir to Assam and Burma. The present race *leucocera* is the typical South Indian form.

Habits : This species, like the other members of the genus, frequents sheltered and shady places in thick jungle in hilly regions having plenty of rainfall. This is the most widely distributed species of the genus, being found in the wooded slopes of the hills up to an altitude of 8000 feet. They frequently rest on the underside of leaves.

Genus **Tagiades** Hübner.

Butterflies of this genus resemble closely those of the preceding one, but lack the prominent white discal bar, and are popularly known as the White Flats or Snow Flats. They are normally dark brown, with small, semitransparent spots on the forewing. The upperside of the hind wing is either plain, or more usually, with a more or less extensive white tornal area. The underside of the hind wing is mostly white.

Of the five known Indian species of this genus, three are represented in the Museum collection. Two of these occur in South India, while the third, found from Madhya Pradesh northwards, has only been tentatively identified.

Tagiades Obscurus athos Plotz.

The Suffused Snow Flat.

Plate XXIX, fig. 5.

Specimens in the collection : Three, two of which are from Cochin, and one from the Nilgiris; 42 mm. This is 3 mm. less than the minimum recorded expanse.

Description : ♂ ♀ : The upperside is blackish brown, often faded into brown, with three or fewer apical semitransparent white dots on the forewing. The upperside of the hind wing bears a suffused bluish margin (which is narrower in the female) and also black discal spots arranged more or less in an even curve. The cilia on the upperside of the hind wing are normally brown.

On the underside, the forewing is dark brown, but most of the hind wing is whitish.

Expanse : 45 - 50 mm.

Range : South India, up to North Canara; Sikkim to Assam and North Burma. The present race, *athos* Plotz, is the typical Indian race of the species.

Habits : This species is confined to heavily wooded regions on the hills. Their flight is fast, but they rarely venture out from the heavy shade of the thick jungle. They frequently settle on the under side of leaves. More rarely, they visit flowers.

Tagiades atticus atticus (Fabricius).

The Common Snow Flat.

Plate XXIX, fig. 6.

Specimens in the collection : One, 45 mm. Its locality is not recorded. This is not a South Indian species, and the identification of the present specimen is tentative.

Description : ♂ ♀ : This species closely resembles the preceding one, but the upperside of the hind wing lacks the bluish grey suffusion on the margin, characteristic of the preceding species. The upperside is dark brown, and the forewing bears discal, semitransparent white spots. The upperside of the hind wing bears black discal spots, but not arranged in an even curve. In the present specimen, these spots are obscure.

Expanse : 42 - 52 mm.

Range : Central India, Madhya Pradesh to Bengal; Himalayas, from Dehra Dun to Assam and Burma.

Habits : These are the same as those of the precedings species.

Tagiades litigiosa vajuna Fruhstorfer.

The Water Snow Flat.

Plate XXIX, fig. 7.

Specimens in the collection : Four, Pulney Hills, the Nilgiris and Trivandrum; 40 mm.

In two of these specimens, the upperside of the hind wing is largely white, while in the other two, this area is yellowish brown.

Description : ♂ ♀ : The upperside is blackish brown, fading to dark brown. On the forewing, there are semitransparent, small, white discal spots, inner apical spots, two spots at the end of the cell, and a costal spot above them. Some of these spots may be absent in some specimens. The upperside of the hind wing is mostly pure white, except for the costal and apical area which are of the dark brown ground colour. Prominent, large, black marginal spots are present on the white area. As mentioned above, in two of the specimens in the collection, the white is replaced by yellowish brown on the hind wing.

The colour and markings on the underside are more or less the same as those on the

Expanse : 37 - 44 mm.

Range : The range of the species as a whole extends over Ceylon, Peninsular India and the Himalayas from Simla eastwards to Assam and Burma, but the present race, *vajuna* Fruhstorfer, is confined to South India and Ceylon.

Habits : These are more or less the same as those of *Tagiades obscurus* described above. They are confined to shady jungles on the hills, and are capable of rapid flight. They frequently settle on the underside of leaves or on birds' droppings.

Genus **Coladenia** Moore.

This genus includes small to medium-sized, usually dark brown butterflies popularly known as the Pied Flats. The upperside is fulvous, dark brown or grey. The upperside of the forewing bears large, semitransparent, white or yellow discal spots. The upperside of the hind wing usually bears dark spots.

Two species are recorded from South India; both these are represented in the Museum collection.

Coladenia dan dan (Fabricius).

The Fulvous Pied Flat.

Plate XXIX, fig. 8.

Specimens in the collection : Three, Malabar, Coorg and the Nilgiris, 34 mm. less than the minimum recorded expanse.

Description : ♂ ♀ : The upperside is dark golden brown. The markings on the forewing consist of large, semitransparent spots connected to form a broad, irregular discal band as in *Celaenorrhinus*. These spots are white in the female, and yellow in the male. There is also a group of three almost confluent spots in the apical region near the costa. The upperside of the hind wing bears suffused faint, connected dark spots.

The colour and markings on the underside are more or less the same as on the upperside.

Expanse : 40 - 46 mm.

Range : The range of the species as a whole extends over South India, and the Himalayas from Kulu to Assam and Burma, but the present race *dan* Fabricius, is the typical South Indian race.

Habits : This species is common in the wet hilly regions. It is not so exclusively confined to shady, thickly wooded parts as the few preceding species, but comes out into the open more frequently and sometimes basks in the sunshine, resting on leaves.

Coladenia indrani indra Evans.

The Tricolor Pied Flat.

Plate XXIX, fig. 9.

Specimens in the collection : One, 35 mm. Its locality is not recorded.

Description : ♂ ♀ : This species closely resembles the preceding one, the semitransparent white markings on the forewing being disposed much as in that species. The resemblance is more striking in the present race, *indra* Evans, which is the Southern race. But on the upperside of the hind wing, the black spots are separate and well marked, and there is a marginal row of yellow, opaque spots on the upperside of the forewing. On the underside of the hind wing, the black spots over the basal area are prominent.

Expanse : 35 - 40 mm.

Range : The range of the species as a whole extends over Ceylon, South India, and northwards to Bengal, Mussooree, Sikkim and Burma, but the present race *indra* Evans, is the Southern race, confined to Ceylon and South India, up to Bengal.

Habits : Its habits are more or less the same as those of the preceding species. It is generally found on the hills at low elevations.

Genus **Tapena** Moore.

This genus includes black or dark brown butterflies, popularly known as the Black Angles. The upperside is nearly black in the male, and brown in the female. The single Indian species of this genus, namely, *T. thwaitesi* is represented in the Museum collection by the South Indian race, *hampsoni* Elwes.

Tapena thwaitesi hampsoni Elwes

The Black Angle.

Plate XXIX, fig. 10.

Specimens in the collection : One; Nilgiris, 32 mm.

Description : ♂ ♀ : The upperside is nearly black in the male, but brown in the female. On the upperside of the forewing, there is a dark, diffused, central Y-shaped band, a black spot near the base of the cell and near the tornus, and three semitransparent, closely-spaced, prominent white apical spots. On the upperside of the hind wing there is a semitransparent white spot in the cell, a narrow dark discal band and dark spots at the bases of interspaces 1 and 7. In the female, the dark markings on the upperside of the forewing are faint.

On the underside, the colour and markings are more or less similar.

Expanse : 30 - 35 mm.

Range : South India.

Habits : This is a rare species, confined to the forested slopes of the hills in South India. Its habits are more or less the same as those of the species of the preceding genus.

Genus **Odontoptilum** De Niceville.

This genus includes medium-sized butterflies with angular, pale brown wings with chestnut markings, and are popularly known as the Chestnut Angles. The upperside of the forewing bears semitransparent white spots, but the discal spots are small, or absent. The upperside of the hind wing bears white lines, while its underside is mostly white, with some dark markings at the tornus and costa. Only a single species has been recorded in India, and this is represented in the Museum collection.

Odontoptilum angulata Felder.

The Chestnut Angle.

Plate XXIX, fig. 11.

Specimens in the collection : One, Nilgiris; 41 mm. The left forewing is broken in this specimen.

Description : ♂ ♀ : The wings are angular. On the upperside of the forewing, the inner portion is pale brown while the outer third of the surface is bright chestnut. There are broad, discal and post-discal chestnut bands, and a discal white lunulate spot in interspace 2 and a dot in interspace 3. A few semitransparent white apical spots are also present. But there are no white lines on the upperside of the forewing. The upperside of the hind wing is pale brown, with the apical area coloured dark chestnut, and narrow white sub-basal and post-discal, marginal and sub-marginal white lines are present. The dorsum and the tornus of the hindwing are clothed with white hairs.

Expanse : 40 - 45 mm.

Range : South India, and northwards, throughout Peninsular India; Kulu to Bengal; Assam and Burma.

Habits : This species is most commonly found in hilly forested regions up to an altitude of 8000 feet. It prefers sheltered, shady localities, although it ventures out frequently in the open sunshine and visits flowers. It usually rests on the under surface of leaves, but the edges of its wings are slightly turned down. Sometimes, it settles on damp patches of ground.

Genus **Caprona** Wallengren.

This genus includes dark brown butterflies with central and marginal portions with the wings coloured golden brown. They are popularly known as the Golden Angles. The

upperside of the forewing bears semitransparent, white, discal and apical spots. The single Indian species of this genus is represented in the Museum collection by the typical South India race, *potiphera* Hewitson. There is considerable seasonal variation in these butterflies.

Caprona ransonnetti potiphera Hewitson.

The Golden Angle.

Plate XXIX, fig. 12.

Specimens in the collection : Three, Nilgiris and Coorg; 42 mm. All of them belong to the Wet season form to which the following description applies.

Description : ♂ ♀ : The wings are angular, but less markedly so than in the preceding species. The upperside of the forewing is dark brown, with the central and marginal areas coloured golden yellow, and bears semitransparent white large and small discal spots and a group of somewhat elongate, small, apical spots. The upperside of the hind wing is dark brown with the central yellowish brown area divided by dark veins.

The underside of the hind wing is white, with basal, discal and submarginal rows of dark spots.

The Dry season form is similar, but much paler, with the yellowish brown markings larger and better defined.

Expanse : 35 - 45 mm.

Range : The range of the species as a whole extends over South India and Peninsular India up to Madhya Pradesh, Punjab, Assam, Burma and Ceylon.

Habits : This species is common in thickly forested areas on the hills in South India at low elevations. Its flight is rapid, but it flies close to the ground. It frequently settles on damp patches of ground, and also visits flowers and basks on leaves in the sunshine.

Subfamily 2. HESPERIINAE.

This subfamily includes mostly species living at high elevations, in the dry, north-western parts of India.

Genus **Syrichtus** Boisduval.

(Syn. **Hesperia** Fabricius).

This genus includes small, dark brown or greenish butterflies with numerous white semitransparent spots on both the wings. These are the ordinary Skippers. This is a widely distributed genus, ranging over Asia and Southern Europe, but only two species are known in India, and of these, the commoner one, *Syrichtus galba* (Fabricius), the Indian Skipper, alone is represented in the Museum collection. The name of this genus has been currently changed to *Spialia*.

Syrichtus galba (Fabricius).

The Indian Skipper.

Plate XXX, fig. 1.

Specimens in the collection : Four, two of which are from the Nilgiris, and the other two from Madras; 21 mm.

Description : ♂ ♀ : The upperside is dark brown, with numerous white semitransparent spots on both the wings. The upperside of the forewing bears a spot across the cell about its middle, a series of discal and apical spots and also a row of much smaller submarginal spots. The upperside of the hind wing bears more or less the same arrangement of spots, but some of the apical spots are absent. There is usually a spot at the base of the cell.

The underside of the wings is greenish brown, with rather a variable pattern of spots. On the underside of the hind wing there is a spot at the base of the cell, a continuous discal row of spots and a submarginal row of small irregular spots, which are separate.

Expanse : 25 mm.

Range : Ceylon, South India to Karachi; generally throughout India and extending into the Shan States in Burma.

Habits : The habits of this species resemble those of the other Skippers generally. This species occurs in the hills as well as on the plains, and is widely distributed. It is common all over India and is found up to an altitude of 8000 feet on the hills of South India. It keeps close to the ground and often settles on grasses and leaves with the wings closed over the back.

Genus **Gomalia** Moore.

This genus includes small olive brown Skippers with marbled white markings above. They are popularly known as the African Marbled Skippers. The single Indian species and race of this genus, *Gomalia elma albofasciata* Moore, is represented in the Museum collection.

Gomalia elma albofasciata Moore.

The African Marbled Skipper.

Plate XXX, fig. 2.

Specimens in the collection : Three, Nilgiris; 24 mm.

Description : ♂ ♀ : The upperside is olive brown, overlaid with greenish hairs. The upperside of the forewing bears a narrow black band within the discal area. Small, semitransparent white spots are present across the cells and on the discal and apical

areas. The upperside of the hind wing bears a broad, regular, central white band from vein 1 to vein 7 and a faint pale band near the margin.

On the underside, the wings are pale brown, with the white markings more extensive. On the underside of the forewing, the dorsum is pale.

Expanse : 25 mm.

Range : Ceylon; South India to Poona; Sind and Baluchistan.

Habits : These resemble those of the other Skippers in general. This is a rather scarce, but widely distributed species of Skipper. It has been recorded from the Nilgiris, Poona, Kangra, Sind, and even from Baluchistan. It usually frequents dry and open country. It settles with the wings closed obliquely over the back much as in moths.

Subfamily 3. ISMENINAE.

This subfamily includes some of the largest and finest members of the family of Skippers. Some species are brightly coloured. Their flight is very swift. They are crepescular in their habits, flying early in the morning and again late in the evening. They are mostly confined to thickly forested country on the slopes of hills where there is plenty of rainfall.

Four out of the five known Indian genera of this subfamily are represented in the Museum collection.

Genus **Hasora** Moore

This generic name has been currently changed to *Chromus*. This genus includes moderate sized Skippers commonly known as the Awls. The upperside is dark brown, usually unmarked in the male. In the female, the upperside of the forewing bears pale yellow semitransparent spots. The underside is uniformly purple or tinged with green, sometimes with a conspicuous pale band on the hind wing.

Of the four Indian species of this genus, only one, *Hasora alexis* (Fabricius), which is the commonest, is represented in the Museum collection, by the typical race, *alexis* (Fabricius).

Hasora alexis alexis (Fabricius).

The Common Banded Awl.

Plate XXX, fig. 3.

Specimens in the collection : Six, Nilgiris and Malabar; 45 mm. Three of them are males, and the rest females.

Description : ♂ : The upperside of the forewing bears two fairly large, hyaline, yellowish white discal spots, and a minute spot near the apex.

PLATE XXX

PLATE XXX

Fig. 1. *Syrichtus galba* (Fabricius) (x 1 ½).

" 2. *Gomalia elma albofasciata* Moore (x 1 ½).

" 3. *Hasora alexis alexis* (Fabricius) (natural size).

" 4. *Ismene jaina fergussoni* De Niceville (x $^3/_4$).

" 5. *Choaspes benjaminni* (Guerin) (natural size).

" 6. *Badamia exclamationis* (Fabricius) (natural size).

" 7. *Suastus gremius gremius* (Fabricius) (natural size)

" 8. *Arnetta vindhiana* (Moore) (natural size).

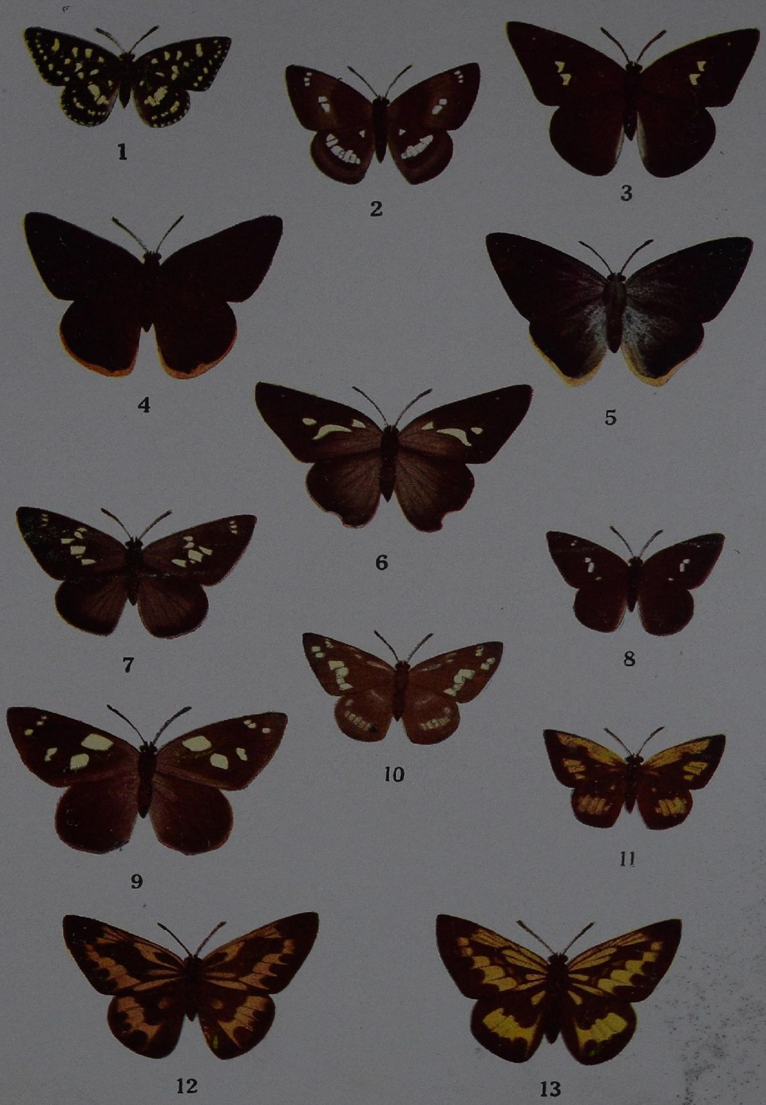
" 9. *Gangara thyrsis thyrsis* (Fabricius) (x $^3/_4$).

" 10. *Taractrocera maevius flaccus* (Fabricius) (x 1 ½).

" 11. *Ambitta dioscorides* (Fabricius) (x 1 ½).

" 12. *Telicota augias augias* (Linnaeus) (x 1 ½).

" 13. *Telicota pythias bambusae* Moore (x 1 ½).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♀ : The underside is uniformly dark brown with a dull, steel-blue gloss. The underside of the hind wing bears a narrow, bluish white, diffuse, discal band and a black patch over the tornal area.

Expanse : 45 - 50 mm.

Range : The range of the species as a whole extends over the whole of India, Ceylon, Baluchistan and Burma, and even beyond the Indian limits, to China, Siam and Celebes, but the present race, *alexis* (Fabricius), is the typical Indian form.

Habits : This is the commonest and most widely distributed species among the members of the subfamily Ismeninae. It is found both on the hills and in the plains, in thick forest as well as open country. Its flight is rapid and fairly well sustained. It visits flowers and rests on the underside of leaves, but sometimes basks in the sunshine with the wings partly open.

Genus **Ismene** Watson.

The members of this genus are now included under the genus *Bibasis*. This genus includes fairly large, dark brown butterflies popularly known as the Awlets. They are unmarked and uniformly dark brown above, and striped on the underside. The cilia fringing the hind wing forms an orange border to the hind wing.

Of the two Indian species of this genus, the commoner and better known one, the Orange Awlet, *Ismene jaina* Moore, is represented in the Museum collection by the typical South Indian race, *fergussoni* De Niceville.

Ismene jaina fergussoni De Niceville.

The Orange Awlet.

Plate XXX, fig. 4.

Specimens in the collection : Three, South India; 58 mm. Their exact locality is not recorded, but they are probably from Coorg.

Description : ♂ ♀ : The upperside is bright chocolate brown. The forewing bears an orange costal streak from the base above the cell to about half way up the wing. The ciliary fringe on the hind wing bears orange stripes along the veins.

The male bears an obscure dark sex brand on the upperside of the forewing.

Expanse : 60 - 70 mm.

Range : The range of the species as a whole extends over South India to North Canara; Ceylon; Western Ghats; Mussoree to Sikkim, Assam and Burma. The present race is confined to South India, up to North Canara.

Habits : This species is found on the hills in thickly forested regions at low elevations. Its flight is extremely rapid, and it is commonly seen flying around hill streams in the

mornings and evenings. It settles on leaves and visits some of the brightly coloured flowers. It is common in Coorg, but is rare in other localities in South India.

Genus **Choaspes** Moore.

This genus was formerly better known by its synonymous name, *Rhopalocampta*. This genus includes fairly large, dark brown butterflies commonly known as the Awlkings. The upperside is dark bluish or purplish brown, more or less overlaid with dark greenish hairs over the basal area. These are replaced by bluish hairs in the female. The underside is greenish with black veins. The tornus and the ciliary fringe on the hind wing are bright yellowish orange. The single known Indian species of this genus, the Indian Awlking, *Choaspes benjaminni* Guerin, is represented in the Museum collection.

Choaspes benjaminni (Guerin).

The Indian Awlking.

Plate XXX. fig. 5.

Specimens in the collection : Two, one of which is from the High Range, Travancore, (altitude, 7,800 feet); 51 mm. The locality of the other specimen is not recorded. Both of them were originally labelled *Rhopalocampta benjaminni benjaminni* Guerin, *Rhopalocampta* being a synonym for *Choaspes*. The race *benjaminni* Guerin is the typical Indian race to which the present specimens belong.

Description : ♂ : The upperside is glossy and deep indigo blue, overlaid with greenish hairs in the basal area. In young specimens, the basal hairs are purplish.

♀ : The upperside is glossy dark green, overlaid with bluish grey hairs over the basal area.

♂ ♀ : On the upperside of the hind wing, the tornal area and the ciliary fringe are bright orange up to the level of vein 3. The underside of the hind wing is glossy green with the veins marked black and the tornal area coloured orange.

Expanse : 50 - 60 mm.

Range : Ceylon, South India; Palnis, Nilgiris, Coorg, Simla, Kulu to Assam and extending to North Burma and China. This is the range of the species as a whole, but the race *benjaminni* Guerin, to which the present specimens belong is confined to India.

Habits : This species is confined to the hills at elevations ranging from 3000 to 8000 feet. It is mostly found in thick jungle. It is crepescular in habits and frequently visits flowers and damp patches of ground.

Genus **Badamia** Moore.

This genus includes dark brown butterflies with comparatively narrow and elongately triangular and produced forewings, popularly known as the Brown Awls. The upperside

is dark brown, the basal areas of the wings being distinctly paler. The upperside of the forewing bears semitransparent white spots which are larger in the female. The underside is pale brown.

This genus includes only a single, widely distributed species, and this is well represented in the Museum collection.

Badamia exclamationis Fabricius.

The Brown Awl.

Plate XXX, fig. 6.

Specimens in the collection : Eight, Coorg, Palni Hills, Nilgiris and Madras; 51 mm.

Description : ♂ ♀ : The forewing is elongated and narrow and apically produced. The upperside is dark brown, with the basal areas of the wings much paler brown. The upperside of the forewing bears slender, white, semitransparent, transversely elongated spots in the cell and in interspaces 2 and 3. These spots are larger in the female in which there is an additional spot in interspace 1 b. The underside of the wings is pale brown; on the underside of the hind wing, the tornus is dark brown, crowned by a whitish spot.

Expanse : 50 - 55 mm.

Range : Throughout India, Burma and Ceylon, and also extending to the Andamans and Nicobars, China and Australia.

Habits : This species is easily recognized by its long, narrow forewings. It is found throughout India on the hills as well as in the plains, but is more commonly found in thick jungle. Its flight is very rapid, and of a bounding type. It is usually crepescular in habits and frequently attracted to flowers. The males sometimes settle on damp patches of ground, or on bird's droppings, and also bask on leaves in the sunshine.

Subfamily 4. PLASTINGIINAE.

This subfamily includes medium-sized brown butterflies with white discal spots on the forewing, popularly known as the Bobs. Most of the species are rare and occur only in the more remote regions of North East Himalayas. The only common Indian genus of this subfamily is *Suastus*, and this and the allied genus *Arnetta* are represented in the Museum collection.

Genus **Suastus** Moore.

The upperside is dark brown, usually with semitransparent white spots on the forewing and dark spots on the underside of the forewing. Of the two Indian species, the commoner one, *S. gremius* is represented in the Museum collection by the typical Indian race, *gremius* (Fabricius).

Suastus gremius gremius (Fabricius).

The Indian Palm Bob.

Plate XXX, fig. 7.

Specimens in the collection : Six, Madras and the Nilgiris; 36 mm.

Description : ♂ ♀ : The upperside is dark brown, with semitransparent cell and prominent hyaline white, more or less squarish or rectangular discal spots on the forewing. Small white apical spots are also present in interspaces 6 - 8. The upperside of the hind wing is uniformly brown, unmarked. On the underside of the forewing, the apex and costa are grey, sometimes with a few black spots at the apex. But the most characteristic feature of this species is seen on the underside of the hind wing, which is brown, overlaid with greyish ochreous scales and bearing a number of sharply defined black spots. This feature distinguishes it from all other species of Skippers.

Expanse : 32 - 42 mm.

Range : This is a widely distributed species, occurring in India, Burma and Ceylon and extending even to South China, the present race *gremius* (Fabricius) being the typical Indian form.

Habits : This is a fairly common species occurring almost throughout India where palm trees abound. Its flight is rapid, and it may be seen settling on damp patches of ground or on leaves. Sometimes, the males bask in the sunshine. They also frequently settle on flowers.

Genus **Arnetta** Watson.

This genus constitutes another group of small Skippers, commonly known as the Bobs, more or less similar to those of the preceding genus. The upperside is dark brown, with small, semitransparent white spots on the forewing. There is one spot at the upper end of the cell, two discal spots and three minute apical spots in interspaces 6 - 8. The underside of the hind wing bears a row of small, white discal spots in interspaces 1 - 7 in the middle of the cell, and a double spot at the base of vein 1 c.

Of the two Indian species of this genus, one is confined to the Sikkim - Assam region, and the other to South and Central India. The latter species alone is represented in the Museum collection.

Arnetta vindhiana (Moore)

The Vindhyan Bob.

Plate XXX, fig. 8.

Specimens in the collection : One, 31 mm. Its locality is not recorded.

Description : ♂ ♀ : The characters are more or less the same as those mentioned in the generic description above. On the upperside, the spot near the upper edge of the cell may be absent. On the underside of the hind wing, where the ground colour is ochreous brown or greenish ochreous, the spots are obscure. In the male, the tuft (present in the other species) is absent on the underside of the forewing.

Expanse : 25 - 32 mm.

Range : Southern India to Central India.

Habits : This species is found on all the hills of South India, and Madhya Pradesh, and must have also been recorded from the Vindhya mountains, as indicated by the specific name. It usually frequents dry, hilly country, where bamboo plants abound, but it has also been collected from thick jungle on the slopes of the Nilgiris where the rainfall is heavy. It visits flowers and sometimes settles on grass and dry leaves.

Subfamily 5. ERIONOTINAE.

This subfamily includes moderate or large-sized butterflies commonly known as the Redeyes. The upperside is unmarked, or bears large, hyaline, yellow spots on the forewing. During life, the eyes are blood red-a feature by which these butterflies may be readily distinguished from the other groups of Skippers.

A single genus, *Gangara*, which includes the Giant Redeyes is represented in the Museum collection by the sole Indian species, *Gangara thyrsis* (Fabricius).

Genus **Gangara** Moore.

This genus includes rather large-sized, dark brown butterflies, popularly known as the Giant Redeyes.

The single Indian species of this genus is represented in the Museum collection by the typical Indian race, *Gangara thyrsis thyrsis* (Fabricius).

Gangara thyrsis thyrsis (Fabricius).

The Giant Redeye.

Plate XXX, fig. 9.

Specimens in the collection: One, Malabar, 60 mm. This is 10 mm. smaller than the minimum recorded expanse.

Description : ♂ ♀ : The upperside is dark chocolate brown, with large, more or less squarish or rhomboidal, semitransparent yellow spots across the cell and over the discal area in interspaces 2 and 3. Smaller apical spots, also squarish, are present in interspaces 6 - 8 that in interspace 6 being somewhat detached and not in line with the others.

On the underside, the forewing bears bluish white scales at the apex and bands of similar scales on the hind wing. The cilia on the hind wing are grey at the apex. In the male, the underside of the forewing bears a tuft along vein 1.

Expanse : 70 - 76 mm.

Range : The range of the species as a whole is fairly wide, extending over Ceylon, South India and northwards throughout Central India and to Bombay and Calcutta, Sikkim, Assam and Burma, but the present race *thyrsis* (Fabricius) is the typical Indian race. The Ceylon race is designated *Gangara thyrsis clothilda*, and is distinguished by the presence of a small opaque spot in vein 1 on the forewing.

Habits : This species is crepescular in its habits, flying during the early hours of the morning and again late in the evening, resting during the greater part of the day in sheltered situations with the wings closed. It is found mostly in hilly, forested country where palm trees abound, these being the food plants of this species.

Subfamily 6. PAMPHILINAE.

This subfamily includes small species of Skippers inhabiting grassland or paddy fields and are commonly known as the Grass Darts and Scrub Hoppers. They fly close to the ground, in a weak, unsteady manner, settling frequently on grass stems or on flowers. They also bask in the sunshine with the wings partly opened. The larvae feed on grasses. Two genera comprising the Grass Darts and Bush Hoppers, are represented in the Museum collection.

Genus **Taractrocera** Butler.

This genus includes small dark brown Skippers commonly known as the Grass Darts. The upperside of the forewing bears small discal spots in interspaces 1 - 8, those in interspaces 4 and 5 being pushed outwards. The upperside of the hind wing also bears pale discal spots.

Of the two species recorded from South India, only one, the Common Grass Dart, *T. maevius* (Fabricius) is represented in the Museum collection, by the typical Indian race, *flaccus* Fabricius.

Taractrocera maevius flaccus (Fabricius).

The Common Grass Dart.

Plate XXX fig. 10.

Specimens in the collection : Five, Nilgiris, 24 mm One of these specimens is incomplete.

Description : ♂ ♀ : The upperside is dark brown, with white discal spots. The lower edge of the cell on the forewing bears a narrow white streak. The discal spots on the upperside of the hind wing are arranged in a straight line. The underside of the hind

wing is overlaid with dark ochreous to whitish scales, the veins being distinctly pale. The ground colour is whitish brown or greenish brown, and there is a spot in the middle of interspace 7, a cell spot across the cell and a spot in interspace 1

Expanse : 22 - 28 mm.

Range : The range of the species as a whole extends over India, Burma and Ceylon, but the present race, *flaccus* (Fabricius) is the typical Indian race. The Ceylon race is designated as *T. maevius maevius* in which the underside of the hind wing is overlaid with dark ochreous scales and the veins are colourless.

Habits : This species is locally common in certain areas and is widely distributed. It occurs all over India in grassland and meadows upto an altitude of 5000 feet. Its habits are more or less the same as those of the Grass Darts in general, described for the subfamily Pamphilinae.

Genus **Ampitta** Moore.

This genus includes rather small, dark brown Skippers with opaque yellow markings on the upperside of both the wings. They are commonly called the Bush Hoppers. The underside of the hind wing is either yellow with small black spots, or dark brown, with yellow spots.

A single species, *A. dioscorides* (Fabricius), which is the only species of this genus common in India, is represented in the Museum collection.

Ampitta dioscorides (Fabricius).

The Bush Hopper.

Plate XXX, fig. 11.

Specimens in the collection : Two, one from the Nilgiris and the other from Pulney Hills; 24 mm.

Description : ♂ : The upperside is dark brown. On the upperside of the forewing (which bears a sex brand), the yellow markings are very wide. There is a prominent long discal spot in interspace 1 b. The entire cell and costa are yellow to beyond the middle. The discal spots in interspaces 2 an 3 are connected to form a large patch. The apical spots in interspaces 6 to 8 are also coalescent to form a long patch, and may be connected with the yellow costal area. The upperside of the hind wing bears a broad, yellow discal area, traversed by dark veins. The underside of the hind wing is yellow, with faint black spots.

This is very variable; as a rule, it is similar to the male, but with the yellow spots usually much smaller in size.

Expanse : 22 - 28 mm.

Range : Ceylon, Peninsular India, Bengal, Sikkim to Assam, and Burma, and extending also to Malay peninsula rand China.

Habits : This species is easily recognized by its characteristic brown and yellow colour pattern. It is usually found in pady fields, but it also occurs at low elevations in open country, flying rapidly among bushes, close to the ground.

Subfamily 7. ERYNNINAE.

This subfamily includes small or moderately small butterflies popularly known as the Darts, Dartlets, Aces and Hedgehoppers. The upperside is usually brown, with a tawny yellow band on both wings, or marked with small, semitransparent or orange spots. They occur mostly in the jungle, preferring the shade of trees and bushes. The larvae feed on Grasses and Bamboos. All the five known common Indian genera of this subfamily are represented in the Museum collection.

Genus **Telicota Moore.**

This genus was formerly known as *Astychus*. It includes moderately small, dark brown Skippers, with an orange discal band on the upperside *of both the wings*. The forewing also bears a central black band within the discal band. These are commonly called the Palm Darts. Their food plants are the sugar Cane or the Bamboo. The male bears a sex brand on the forewing.

Both the known Indian species of this genus, namely *Telicota augias* and *Telicota pythias*, are represented in the Museum collection. They now appear to be treated as forms of *Telicota ancilla* which is a synonym for T. *augias*.

Telicota augias augias (Linnaeus).

The Pale Palm Dart.

Plate XXX, fig. 12.

Specimens in the collection : Two, Bangalore, 32 mm. The smaller specimen, measuring 30 mm. is 2 mm. smaller than the minimum recorded expanse.

Description : ♂ ♀ : The upperside is dark brown; on the upperside of the forewing there is a yellowish or orange-yellowish band of connected spots in interspaces 1 to 5. The yellow of the discal band on the forewing is continued on to the margin, through the dark brown, border above each vein. The outer edges of th discal spots are also deeply excavated. A group of connected apical spots are present in interspaces 6-8.

The upperside of the hind wing bears a spot in the cell, connected with the base by a yellow streak and a broad, discal yellowish band of connected spots in interspaces 1 - 4 or 5. The underside is dark brown with the apex and costa of the forewing and the entire hind wing overlaid with ochreous or dark brown scales.

The male bears a broad grey sex brand on the forewing.

Expanse : 32 - 36 mm.

Range : This is a widely distributed species, ranging over India, Ceylon, Sikkim to Burma and extending to China and Malay Peninsula, but the present race, *auglas* (Linnaeus), is the typical Indian race.

Habits : This species includes medium-sized Skippers capable of strong and rapid flight. They settle frequently on leaves. It is commonly found in open country. The food plant of the larvae is Sugar Cane.

Telicota pythias bambusae Moore.

The Dark Palm Dart.

Plate XXX, fig. 13.

Specimens in the collection : Seven, Pulney Hills and the Nilgiris;33 mm.

Description : ♂ ♀ : This species, which is commoner than the preceding one, resembles it in general appearance, but the markings on the upperside are much darker orange than in that species. On the upperside of the forewing the outer edge of the connected discal spots are hardly excavated and the yellow is not continued along the veins across the dark border up to the termen. The underside is more or less similar to that in the preceding species.

The sex brand in the male is darker and narrower than in the preceding species.

Expanse : 34 - 36 mm

Range : The range of the species as a whole extends over Ceylon, India, Burma and even to Andamans, Siam, China and the Malay peninsula, but the present race, *bambusae* Moore, is the typical indian race. The Malay Peninsular race is designated *pythias*.

Habits : This species is generally found restricted to the hills and forested regions where the rainfall is fairly heavy. Their habits in general are the same as those of the preceding species, but their food plant is the Bamboo instead of the Sugar Cane.

Genus **Oriens** Evans

This genus was formerly known by the more familiar name, *Nicevillea*. It includes tiny, dark brown Skippers with tawny markings, popularly known as the Dartlets. The markings take the form of prominent tawny discal bands on both the wings. On the upperside of the forewing, the lower part of the tawny yellow discal band is central.

Of the two Indian species, the commoner and more widely distributed one, the Common Dartlet, *Oriens gola* (Moore), alone is represented in the Museum collection.

Oriens gola (Moore).

The Common Dartlet.

Plate XXXI, fig. 1.

Specimens in the collection : Three, of which two are from the Nilgiris; 26.5 mm. One of these specimens is incomplete. The locality of the third specimen is not recorded.

Description : ♂ ♀ : The upperside is dark brown, with tawny markings. The upperside of the forewing bears a tawny discal band, composed of conjoined spots. The costa and base are dark. The apical spots in interspaces 6 - 8 are more or less connected to the discal band, by an intervening discal spot in interspace 5. The upperside of the hind wing bears a broad, continuous, bright orange discal band, but there is no spot in the cell or in interspace 7.

On the underside, the costa and apex of the forewing and the entire surface of the hind wing are yellow, or deepening to orange. The discal band on the hind wing and the upper part of the forewing bear black spots.

Expanse : 26 - 28 mm.

Range : Ceylon, South India, Sikkim to Burma, Andamans, and extending even to South China and Malay Peninsula.

Habits : The habits in general resembel those of the other members of this subfamily. This species occurs in the forested regions having plenty of rainfall, up to an altitude of 6500 feet. It keeps mostly close to the ground but its flight is rapid. It often visits flowers and also settles frequently on leaves and twigs.

Genus **Padraona** Moore

The name of this genus has been currently changed to *Potanthus*, but the better known generic name, *Padraona*, is still retained by many authors for convenience.

This genus includes small, dark brown Skippers, with tawny yellow markings on the upperside and popularly known as the Darts. The lower part of the tawny yellow discal band on the upperside of the forewing is discal, and not central as in the preceding genus, *Oriens*. The upperside of the hind wing bears a spot in the cell.

About four or five species are common in India. Of these two alone are represented in the collection. The separation of the species of this genus by external characters is extremely difficult, as many different species tend to look almost alike. The record of *Padraona maesoides* from South Indian in the present collection appears to be new, as this species has been hitherto regarded as a Burmese species.

PLATE XXXI

PLATE XXXI

Fig. 1. *Oriens gola* (Moore) (x 1 ½).

" 2. *Padraona dara pseudomaesa* (Moore) (x 1 ½).

" 3. *Padraona maesoides maesoides* Butler (x 1 ½).

" 4. *Halpe evershadi* Evans (x 1 ½).

" 5. *Halpe moorei* Watson (x 1 ½).

" 6. *Halpe homolea egena* (Felder) (x 1 ½).

" 7. *Baracus vittaus subditus* Moore (x 1 ½).

" 8. *Baracus hampsoni* Elwes (x 1 ½).

" 9. *Baoris kumara kumara* Moore (natural size).

" 10. *Baoris sinensis subochracea* Moore (x 1 ½).

" 11. *Baoris mathias mathias* Fabricius (x 1 ½).

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Padraona dara pseudomaesa (Moore).

The Common Dart.

Plate XXXI, fig. 2.

Specimens in the collection : Three, South Coorg; 25 mm.

Description : ♂ ♀ : The upperside is dark brown, with pale yellow markings. These markings are very narrow. The upperside of the hind wing bears a spot in interspace 5, but there are usually no spots in interspaces 6 or 7. The underside of the hind wing is pale yellow, suffused with black scaling, and with the discal band edged with black spots.

The wet season form is distinguished by the markings above and below being darker and broader, the dry season form being much paler.

Expanse : 27 - 30 mm.

Range : Himalayas, from Chitral to Kumaon, and the plains of South and Central India and Ceylon.

Habits : This species is common in the wet forested slopes of the hills of South India. Its habits are more or less similar to those of the species of the preceding genus *Oriens*.

Wynter-Blyth, in his monograph on the Butterflies of the Indian Region, treats *dara* and *psudomaesa* as separate species of *Potanthus* (synonym for *Padraona*), the former being exclusively confined to the Himalayas (above 6000 feet), and the latter ranging over the lower Himalayas as well as the plains of Ceylon and India. The differences, however, are so slight and insignificant that it seems more convenient to regard them all as belonging to a single race of the species *P. dara*.

Padraona maesoides maesoides Butler.

Plate XXXI, fig. 3.

Specimens in the collection; One, Trivandrum, 25 mm. Evans, in his "Identification of Indian Butterflies", mentions "Dawnas to South Burma" as the range of this species, but it appears to extend to South India also, as evidenced by the present single record from Trivandrum.

Description : ♂ ♀ : This species is more or less similar to the preceding one and difficult to be separated from the latter by any easily recognizable character. The yellow markings on the upperside of the forewing are moderately narrow. The costa and base of the cell are ochreous, with a black streak in the cell. The upperside of the hind wing bears yellow, connected spots in interspaces 4 and 5, extending to the middle of interspace 3. The underside of the hind wing is somewhat dark ochreous with the discal band showing through conspicuously without any black spots.

Expanse : 24 - 28 mm.

Range : The range of this species, as originally defined, extends from Dawnas to South Burma, and to the Malay Peninsula, but the record of the present specimen appears to indicate that its range extends also to South India.

Habits : These are more or less the same as those of the preceding species, but this species is rare and does not appear to have been recorded earlier from South India.

Genus **Halpe** Moore.

This genus includes small, dark brown skippers commonly known as the Aces, with small, semitransparent white or yellow discal, apical and cell spots on the forewings. The upperside of the hind wing may be unspotted or may bear a yellow discal patch. The underside is dark brown, and usually with a pale central band on the underside of the hind wing.

Several species of *Halpe* occur in India, but of these only about six appear to be common, and among them only three species, all of them occurring in South India, are represented in the Museum collection.

Halpe evershedi Evans.

The Palani Ace.

Plate XXXI, fig. 4.

Specimens in the collection : One, Pulney Hills, 33 mm.

Description : ♂ ♀ : The upperside is dark brown, with small yellowish spots on the forewing. The spots in the cell are small and separate. The underside of the hind wing is bright glossy reddish brown, with the basal and marginal areas darker, and bearing a discal row of small, diffused black spots. A narrow strip of the underside of the forewing is dark reddish brown.

Expanse : 36 - 37 mm.

Range : Pulney Hills and Travancore in South India.

Habits : This species is rather rare. This and the succeeding species of *Halpe* are more or less similar in their habits. They inhabit forested areas on the hills at low elevations where the rainfall is neavy. They fly rapidly and usually high above the ground. They are generally shade-loving species and often rest on leaves and flowers.

Halpe moorei Watson.

Moore's Ace.

Plate XXXI, fig. 5.

Specimens in the collection : One, South India; 30 mm. Its exact locality is not recorded.

Description : ♂ ♀ : The upperside of the forewing bears an upper and lower cell spot. The underside of the hind wing bears a broad, continuous white band from the middle of interspace 1 to the apex. There are also connected spots in interspaces 6 and 7, small white spots in interspaces 3 and 5 immediately beyond the band, and small, submarginal spots in interspaces 1 to 3. The underside of the forewing bears prominent whitish submarginal spots from interspace 2 to the costa.

Expanse : 32 mm.

Range : South India; Coorg, Nilgiris, North Canara, North India, South Bihar, and from Mussooree to Burma, and extending also into the Andamans.

Habits : These are more or less similiar to those of the preceding species.

Halpe homolea egena (Felder).

The Ceylon Ace.

Plate XXXI, fig. 6.

Specimens in the collection : A single, unfortunately incomlete, specimen from the Nilgiris; 30 mm. It was originally labelled *Halpe homolea ceylonica* Moore, but closer scrutiny reveals that it is more correctly referable to the present form. This form is described by Wynter-Blyth as a distinct species, *egena*, but this is now regarded as a race of *Halpe homolea*, (Hewitson).

Description : ♂ ♀ : The upperside is brown, that of the forewing bearing small, semitransparent white discal spots in interspaces 2 and 3, an upper cell spot, and two or three small apical spots. The upperside of the hind wing is uniform and unspotted, the central area being paler brown. The underside of the hind wing is greenish brown, with pale yellow discal band and marginal spots. The male bears a sex brand on the upperside of the forewing.

Expanse : 32 - 34 mm.

Range : Ceylon; South India; Travancore, Pulney hills, the Nilgiris, Coorg, Bangalore, Wynaad and Canara.

Habits : This species is found in somewhat drier and more open type of country than most other species of *Halpe*. It is most common on the foot hills of the Nilgiris where large

numbers of males may be seen settled on damp patches of ground. The larval food plant is the Bamboo. This species is also met with in the heavily wooded and wet regions and wet regions of the hills of South India.

Genus **Baracus** Moore.

This genus includes dark brown Skippers commonly known as the Hedge Hoppers. The underside of the forewing bears small, orange-yellow discal spots, and irregularly spaced apical spots in interspaces 6 - 8.

Baracus vittatus subditus Moore.

The Hedge Hopper.

Plate XXXI, fig. 7.

Specimens in the collection : One, Nilgiris; 28 mm.

Description : ♂ ♀ : The upperside is dark brown, with very faint, opaque yellow discal spots in interspaces 1 b to 3 and apical spots in interspaces 6 to 8. On the underside of the hind wing there is a well marked, pale, central streak, and also a pale streak along vein 1. The ground colour on the underside is brownish ochreous. The present race is the typical South Indian race,but in the Ceylon race, *vittatus* Felder, the cell and the lower discal area and almost the whole of the hind wing on the upperside (except the costal and terminal areas) are overlaid with greyish ochreous scales.

Expanse : 30 - 34 mm.

Range : The range of the species as a whole extends over Ceylon, Nilgiris, Pulney Hills, Travancore, Assam and Burma, but the present race *subditus* Moore, is confined to the hills of South Indian (Nilgiris and Pulney Hills).

Habits : This species is confined to the hills at moderately high elevations (above 3000 feet). Its flight is week, and it usually keeps close to the ground, but it ventures out into open country more than the other species of this subfamily.

Baracus hampsoni Elwes.

Hàmpson's Hedgehopper.

Plate XXXI, fig. 8.

Specimens in the collection : One rather badly preserved and incomplete specimen from Trivandrum, South India; 30 mm.

Description : ♂ ♀ : The upperside is dark brown. On the upperside of the forewing the ochreous spots are prominent and the costa is overlaid with yellow scales. The upperside of the hind wing is uniform and unmarked. The underside of the forewing

is bright ochreous over the costa and the apex, this ochreous area being streaked with brown between the veins; the remaining area is black. The underside of the hind wing bears large brown and yellowish brown spots.

Expanse : 26 - 32 mm.

Range : Western Ghats, Coorg, Nilgiris and North Canara.

Habits : This species is confined to low elevations in the Nilgiris and hills of the Western Ghats. Its flight is weak and always close to the ground. It keeps mainly to the shady parts of the jungle where the rainfall is heavy. This species is now regarded as a low altitude race of *B. vittatus.*

Subfamily 8. BAORINAE.

This subfamily includes mostly dark brown Skippers, popularly known as the swifts, inhabiting, as a rule, thick jungle with heavy rainfall, although some species may also be found on open plains. Their flight is powerful, and when at rest, they keep their wings closed over their backs. They also visit flowers. Their food plants are the Grasses and Bamboos.

The majority of the Indian species of this subfamily belong to the genus *Baoris,* which alone is represented in the Museum collection.

Genus **Baoris** Moore.

The upperside is dark brown, with the bases of the wings often overlaid with ochreous hairs. The upperside of the forewing bears semitransparents white or pale yellow discal spots in interspaces 2, 3 and 4, and small apical spots in interspaces 6 to 8. The upperside of the hind wing is unmarked, or with the spots on the underside showing through. The underside of the forewing often bears a pale ill defined discal patch in interspace 1, and the underside of the hind wing bears a pale spot in the cell, and sometimes a discal row of spots.

This is a large genus, comprising about fourteen Indian species, most of which are known to occur in South India and Ceylon as well. Some of these species have now been separated into distinct genera such as *Plytrema, Pelopidas, Parnara, Borbo etc.,* but as the differences are slight, they have all been treated as species of *Baoris* in the present account for convenience.

Out of about a dozen species of *Baoris* recorded from South India, only six are represented in the Museum collection.

In the following descriptions, the equivalents according to the latest generic nomenclature are mentioned within brackets underneath the respective specific headings.

Baoris kumara kumara Moore.

(= **Caltoris kumara kumara** (Moore).

The Blank Swift.

Plate XXXI, fig. 9.

Specimens in the collection : One, Nilgiris; 40 mm.

Description : ♂ : The upperside is dark brown. The spots in interspaces 4 and 8 may be absent. There are no sex brands.

♀ : The upperside of the forewing is dark brown, with a white spot in interspace 1 b. In the male, this spot may be present below as a diffuse spot.

♂ ♀ : The upperside of the hind wing is never spotted, and its underside is normally unspotted, but if spotted, the spots are present only in interspaces 2 and 3. The upperside of the forewing bears no spots in the cell.

Expanse : 42 - 46 mm.

Range : The range of the species *kumara* as a whole is very wide, extending from Ceylon, through the Western Ghats, the Nilgiris and other hills of South India, to Calcutta, Sikkim and Assam in the North , and even to Burma, but the range of the race *kumara* is restricted to South India up to North Canara.

Habits : The species is common in the hills of South India and on the Western Ghats. It occurs up to an altitude of 6,500 feet in the Nilgiris. It usually prefers shady and sheltered situations and is crepescular in habits, but it also ventures out in the sunshine when visiting flowers.

Baoris sinensis subochracea Moore

(= **Pelopidas sinensis subochracea** (Moore).

The Large Banded Swift.

Plate XXXI, fig. 10.

Specimens in the collection : Seven, Malabar and the Nilgiris; 35 mm.

Description : ♂ ♀ : The upperside is dark brown. The upperside of the forewing bears two cell spots. The underside of the hind wing is overlaid with greenish ochreous or greyish scales, and bears prominent white spots in interspaces 2 to 6, and in the cell, but some of these may be absent. These spots usually show through on the upperside of the hind wing. The male bears a sex brand on the upperside of the forewing from vein 1 to spot in interspace 2. The female bears a spot in interspace 1 b and a second smaller one above it on the upperside of the forewing.

Expanse : 38-42 mm.

Range : The range of the species as a whole is wide and extends from Ceylon, through the Pulney Hills and the Nilgris to Coorg and North Canara and North India from Assam and Bengal to Southern Shan States in Burma, but the present race, *subochracea* Moore, is confined to Ceylon and South India up to Bengal.

Habits : This species is confined to the hilly regions where the rainfall is heavy. It is very similar in its habits to the next species, from which it may be distinguished by its larger size. This is also not as common as the next species.

Baoris mathias mathias Fabricius.

[**Pelopidas mathias mathias** (Fabricius)].

The Small Branded Swift.

Plate XXXI, fig.11.

Specimens in the collection: Three, two of which are from Madras; 32 mm. The locality of the third specimen is not recorded.

Description : ♂ ♀ : This species is very similar to the preceding one, but smaller in size. The upperside is dark brown. The white spots on the upperside of the forewing are often small. The underside of the hind wing bears white spots which are very small and varying in number. Sometimes there may be a full complement of spots from interspaces 1 b to 7 and one in the cell, but sometimes they may be absent altogether. The upperside of the hind wing is usually unmarked (as in the present specimens), but may sometimes bear spots in interspaces 3,4 and 6.

Expanse: 32-38 mm.

Range : The range of the species as a whole extends over India, Burma and Ceylon, but the present race, *mathias* Fabricius, is the typical South Indian race.

Habits : This is perhaps the commonest species of the genus *Baoris*, occuring in all types of country. In the hills of South India it is found from low elevations up to an altitude of 7,500 feet. It often ventures out into the sunshine and visits flowers or rests on leaves or on the ground. It is mostly crepescular in habits, being active early in the mornings and again late in the evenings.

Baoris guttatus bada Moore.

(= **Parnara guttatus bada** (Moore).

The Straight Swift.

Plate XXXII, fig.1.

Specimens in the collection: Six (of which one is incomplete) from Madras, Nilgiris and South Coorg; 33 mm. The specimen from South Coorg is larger and darker brown than the rest.

Description : ♂ ♀ : The upperside is dark brown. The upperside of the forewing bears hyaline, evenly spaced white spots in interspaces 2, 3 and 4. There is no spot in the cell or in interspace 1 b. The white spotting on the upperside of the hind wing is variable. The underside of the hind wing usually bears white spots at least in interspaces 4 and 5, and often also in interspaces 2 and 3 - all arranged in a straight, gradually diminishing series and showing through on the upperside as white spots. This discal row may sometimes be curved or irregular.

Expanse : 32 to 36 mm.

Range : The range of the species as a whole extends over Ceylon, India and Burma, and even to Malay Peninsula and North Australia, but the present race, *bada* Moore, is the typical South Indian form.

Habits : This is a common and widely distributed species of moderately small Skippers found only at low elevations on the hills. But the race *guttatus*, which is the Himalayan form, is a typical hill variety occurring up to an altitude of 9,500 feet. The habits of the present species are very similar to those of the preceding species.

Baoris Zelleri colaca Moore.

(=**Borbo cinnara colaca** Moore.)

The Rice Swift.

Plate XXXII, fig.2.

Specimens in the collection: Seven, Madras, South Coorg and the Nilgiris; 30mm.

Description : ♂ ♀ : The upperside is dark brown. The upperside of the forewing always bears a conspicuous white spot in interspace 1 b, and two white spots in the cell. The upperside of the hind wing is usually unmarked or there may be one to three minute spots. The underside of the hind wing is uniformly overlaid with dense greenish ochreous scales, and usually bears white spots in interspaces 2, 3 and 6, and rarely a spot in interspace 4 or at the end of the cell.

Expanse : 30 - 36 mm.

Range : The range of the species as a whole is very wide, extending over Ceylon, India, Burma and even to the Andamans, Philippines, Malay Peninsula and North Australia. The present race, *colaca* Moore, however, is the typical form occurring in South India.

Habits : This species is common at low elevations, but may also occur sparsely at higher elevations up to an altitude of 4000 feet. Its habits are more or less similar to those of the Small Branded Swift.

Baoris bevani bevani Moore.

(= **Borbo bevani bevani**) (Moore)

Bevan's Swift.

Plate XXXII, fig. 3.

Specimens in the collection: One, Nilgiris; 28 mm.

Description : ♂ ♀ : The upperside is rather pale brown. The upperside of the forewing bears a white spot in interspace 3, nearer to the spot in interspace 2 than to the spot in interspace 4, and usually also a spot in interspace 5. A single cell spot is usually present, but may sometimes be absent. The underside is mostly overlaid with pale, greenish ochreous scales. The underside of the hind wing bears small white spots in interspaces 2 to 6, but those in interspaces 4 and 5 may be absent; some of these show through faintly on the upperside. In the female of the present race, the upperside of the forewing bears a white spot in interspace 1 b; this spot may be present in some males also.

Expanse : 32 - 36 mm.

Range : This range of the species as a whole is wide, extending over Ceylon, Peninsular India as well as the Himalayas from Murree to Assam, and Burma and also to the Andamans, Nicobars, Malay Peninsula and the Philippines. The present race, *bevani* Moore, is the typical Indian form.

Habits : This species is locally common, being found both on the hill and in the plains. It frequently visits flowers in gardens, and the northern form is reported to be quite common in the hills of Simla and adjoining areas at elevations of about 7000 feet. In South India, they appear to be more common on the Nilgiris.

Subfamily 9. NOTOCRYPTINAE.

This subfamily includes a large assemblage of dark brown Skippers (known variously as Demons, Coons, Flitters, etc.,) often very varied in size and appearance. They frequent thickly forested country, where they keep mostly to the heavy shade of the trees. Their food plants are all monocotyledenous plants such as Grasses, Palms and Plantains.

Four out of the five Indian genera of this subfamily are represented in the Museum collection.

Genus **Notocrypta** De Niceville.

This genus includes black Skippers of medium size, commonly known as the Banded Demons. The upperside of the forewing bears a broad, slightly curved, hyaline white discal band. The underside is dark brown, with the apical area of the terminal margin of the forewing bearing white scales. Similar white scales are also present on the terminal and middle parts of the hind wing.

The antennae are white, banded below the proximal region of the club or only streaked with white below.

Only two species are recorded from South India and Ceylon, and both these are represented in the Museum collection.

Notocrypta paralysos alysia Evans.

The Common Banded Demon.

Plate XXXII, fig. 4.

Specimens in the collection: One, 38 mm. The exact locality of the specimen is not recorded.

Description : ♂ ♀ : The characters are more or less the same as those of the genus described above. On the upperside of the forewing, the broad, hyaline, slightly curved white discal band is prominent. There are no apical white spots in interspaces 6 - 8 on the forewing. A prominent spot is present in the middle of interspace 4 on the forewing. On the underside, the white scaling is conspicuous.

Expanse : 33 - 40 mm.

Range : The range of the species as a whole is very wide, extending over Ceylon, South India, Western Ghats to North Canara; in North India, along the Himalayas, from Mussooree to Assam and Karens, and extending even beyond Indian limits to Burma, Java, Borneo and Andamans where other races of this species have been recorded, but the present race *alysia* Evans is the typical Indian race.

Habits : This species is restricted to wet evergreen forests where they inhabit the more sheltered and shady parts of the jungles. They fly close to the ground, but powerfully and rapidly, although their flight is not sustained for any length of time. This species is much less common than the next species, but occurs plentifully in Ceylon and Coorg. They are crepescular in their habits, visiting flowers in the mornings and evenings and resting on leaves during the rest of the day.

Notocrypta curvifascia (Felder).

The Restricted Demon.

Plate XXXII, fig. 5.

Specimens in the collection : Four, three of which are from Trivandrum, South Coorg and Coorg; 38 mm. The locality of the fourth specimen is not recorded. The specimens are in a rather poor state of preservation, two of them being incomplete.

Description : ♂ ♀ : The characters are more or less the same as those described for the genus above. It closely resembles the preceding species, but may be distinguished

PLATE XXXII

PLATE XXXII

Fig. 1. *Baoris guttatus bada* Moore (natural size).

" 2. *Baoris zelleri colaca* Moore (x 1 ½).

" 3. *Baoris bevani bevani* Moore (x 1 ½).

" 4. *Notocrypta paralysos alysia* Evans (natural size).

" 5. *Notocrypta curvifasciata* (Felder) (natural size).

" 6. *Udaspus folus* (Cramer) (natural size).

" 7. *Sancus pulligo subfasciatus* Moore (natural size).

" 8. *Iambrix salsala luteipalpus* Plotz (x 1 ½).

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from it by the presence of apical spots on the forewing and by the white discal band on the upperside of the forewing being not continued up to the costa. The apical spots on the forewing are conjoined. The white spotting on the upperside and the white scaling on the underside of the wings are prominent.

Expanse : 38 - 50 mm.

Range : Ceylon, South India, Western Ghats to North Canara, Mysore; Mussooree to Sikkim, Assam and Burma, and extending to the Malay Peninsula.

Habits : This species is more common than the preceding one, but resembles it in its habits. It occurs abundantly on the thickly forested slopes of the Western Ghats wherever the rainfall is heavy, especially during the monsoon.

Genus **Udaspes** Moore.

This genus includes medium-sized, dark brown or black Skippers with large, white markings on the wings. They are popularly known as the Grass Demons. The upperside is dark brown, with large, white, semitransparent spots. The underside is dark brown. Usually with some whitish scaling. The antennae are white, banded below the club.

The single Indian species, *Udaspes folus* (Cramer), is represented in the Museum collection.

Udaspes folus (Cramer)

The Grass Demon.

Plate XXXII, fig. 6.

Specimens in the collection : Five, of which one is from Cochin and another from the Pulney Hills; 42 mm. The exact locality of the other three specimens is not recorded, but they are also probably from the hills of South India.

Description : ♂ ♀ : The upperside is black, with large, white, semitransparent spots. The upperside of the forewing bears a spot across the cell, connected to a bent spot in interspace 1 - 2, a small detached spot in interspace 3, connected post- discal spots in interspaces 4 and 5, and three closely coalescent apical spots in interspaces 6 - 8. On the upperside of the hind wing, there is a large, white, semitransparent central area occupying interspaces 1 - 6. The underside is dark brown, overlaid with white scales on the apex of the forewing and on the dorsum and termen of the hind wing. The ciliary fringe on the wings is alternately banded brown and white.

Expanse : 46 - 48 mm.

Range : Ceylon, South India, ranging northwards to Bombay, Central India, Calcutta and Lucknow, and also in the Himalayas, from Kangra to Assam and Burma, and extending also to China and Malay Peninsula.

Habits : The habits of this species, in general, resemble those of the genus but it frequents more open country on the slopes of the jungles. It may also occur on the plains. It usually flies close to the ground, keeping mostly to the shade, but it is not uncommonly seen basking on leaves and stones in the sunshine and visiting flowers. It prefers the vicinity of water, where it may settle on damp patches of the ground or on stones.

Genus **Sancus** De Niceville.

This genus includes dark, glossy brown skippers, with uniform, unmarked wings. They are commonly known as the Coons. The underside is paler brown.

The single Indian species of this genus, *Sancus pulligo* (Mabille), is represented in the Museum collection by the typical Indian race, *subfasciatus* Moore. The name of this genus has recently been changed as *Psolos*, but the older and better known name, *Sancus*, has been retained in the present account for convenience.

Sancus pulligo subfasciatus Moore.

The Coon.

Plate XXXII, fig. 7.

Specimens in the collection: One, Malabar; 35 mm

Description : ♂ ♀ : The upperside is dark glossy brown, uniform and unmarked. The underside is paler brown. On the underside of the forewing, the dorsum is pale, and the apex bears a narrow, oblique, purplish grey patch. Small, whitish, post-discal and sub-apical spots are also present in interspaces 4 to 9. The underside of the hind wing is pale brown, with faintly marked purplish grey bands over the central and marginal areas, and small, faint, discal pale spots arranged in a line in interspaces 2 to 5 and also in interspaces 6 and 7, and at the upper edge of the cell. The male bears a glossy sex brand on the upperside of the forewing.

Expanse : 36 - 46 mm.

Range : The species as a whole is widely distributed, ranging over South India, Western Ghats, North India; Assam, Cachar to Burma and extending to Siam and Malay Peninsula. The present race, *subfasciatus* Moore, is the typical Indian race.

Habits : This species occurs abundantly in the evergreen forests of the Western Ghats during and after the monsoon. Its flight is very weak and unsteady. It always keeps close to the ground, resting on leaves of low-growing bushes. It generally prefers shady places in the forest.

Genus **Iambrix** Watson.

This genus includes dark brown Skippers, usually of small size, often with some orange scaling, popularly known as the Chestnut Bobs. Normally, hyaline spots are

absent, except on the upperside of the forewing in the female of the common Indian species, *salsala* (Moore). The underside of the hind wing bears small, silvery spots.

The single common Indian species, *Iambrix salsala* (Moore), is represented in the Museum collection by the South Indian race, *luteipalpus* Plotz.

Iambrix salsala luteipalpus Plotz.

The Chestnut Bob.

Plate XXXII, fig. 8.

Specimens in the collection : Two, one from Ganjam and the other from Malabar; 26 mm.

Description : ♂ : The upperside is dark brown, with some dark ochreous orange scaling. The upperside of the forewing bears a more or less complete row of orange discal spots in interspaces 1 to 8.

♀ : The upperside is paler brown, with a similar series of semitransparent spots in interspaces 1 to 8, but these are white, instead of being orange and the row is bent inwards at vein 6.

♂ ♀ : On the underside the costa and apex of the forewing and the entire surface of the hind wing are densely overlaid with orange brown scales. The underside of the hind wing bears black-edged silvery spots of which the one in interspace 5 is larger and more prominent.

Expanse : 26 - 30 mm.

Range : The range of the species as a whole extends over Ceylon, South India, Calcutta, Sikkim, Assam and Burma, and to Malay Peninsula, but the race *luteipalpus* Plotz, to which the specimens in the collection belong, is confined to Ceylon and South India.

Habits : This is a very common species of Skipper occuring on the forested slopes of hills, wherever there is heavy rainfall. It usually prefers shady situations, and keeps close to the ground, frequently settling on leaves of low growing bushes. It has also been observed to visit flowers.

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Names of genera, species, subspecies, races and forms, whether accepted or mentioned as synonyms, are printed in Roman type, as are also names of subfamilies, families, orders, etc. Popular and common names are printed in italics.

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